

Service Manual

dbx/Dolby B-C NR, Auto-Reverse
Cassette Deck

Cassette Deck
RS-B58R
(Silver Face)
(Black Face)



This is the Service Manual
for the following areas.

D ...For all European
areas except United
Kingdom.

B ...For United Kingdom.

RS-8R MECHANISM SERIES

Specifications

Track system:	4-track 2-channel stereo recording and playback	Inputs:	MIC; sensitivity 0.25mV, applicable microphone impedance 400Ω~10kΩ LINE; sensitivity 60mV, input impedance 47kΩ or more
Tape speed:	4.8cm/s	Outputs:	LINE; output level 400mV, output impedance 1.5kΩ or less HEADPHONES; output level 80mV (at 8Ω) applicable headphone impedance 8Ω~600Ω
Wow and flutter:	0.05% (WRMS), ±0.14% (DIN)	Bias frequency:	80kHz
Frequency response:	Metal tape; 20~20,000Hz 30~18,000Hz (DIN) 40~17,000Hz±3dB CrO ₂ tape; 20~19,000Hz 30~17,000Hz (DIN) 40~16,000Hz±3dB Normal tape; 20~18,000Hz 30~16,000Hz (DIN) 40~15,000Hz±3dB	Heads:	2-head system 1-AX (AMORPHOUS) head for record/playback 1-double-gap ferrite head for erasure
Dynamic range:	110dB (at 1kHz) with dbx in	Motor:	2 plus 1-motor system (• 1-Electrical governor motor) (• 2-DC motor)
Max. input level	improvement: 10dB or more improved with dbx in (at 1kHz)	Power requirements:	D ...AC; 220V, 50-60Hz B ...AC; 110/125/220/240V, 50-60Hz Pre-set power voltage 240V
Signal-to-noise ratio:	dbx in; 92dB (A weighted) Dolby C NR in; 73dB (CCIR) Dolby B NR in; 67dB (CCIR) NR out; 58dB (A weighted) (Signal level = max. input level, CrO ₂ type tape)	Power consumption:	18W
Fast forward and		Dimensions:	43cm(W)×9.8cm(H)×27.3cm(D)
rewind time:	Approx. 90 seconds with C-60 cassette tape	Weight:	5kg

Design and specifications are subject to change without notice.

* The term dbx is a registered trademark of dbx Inc.

** 'Dolby' and the double-D symbol are trademarks of Dolby Laboratories Licensing Corporation.

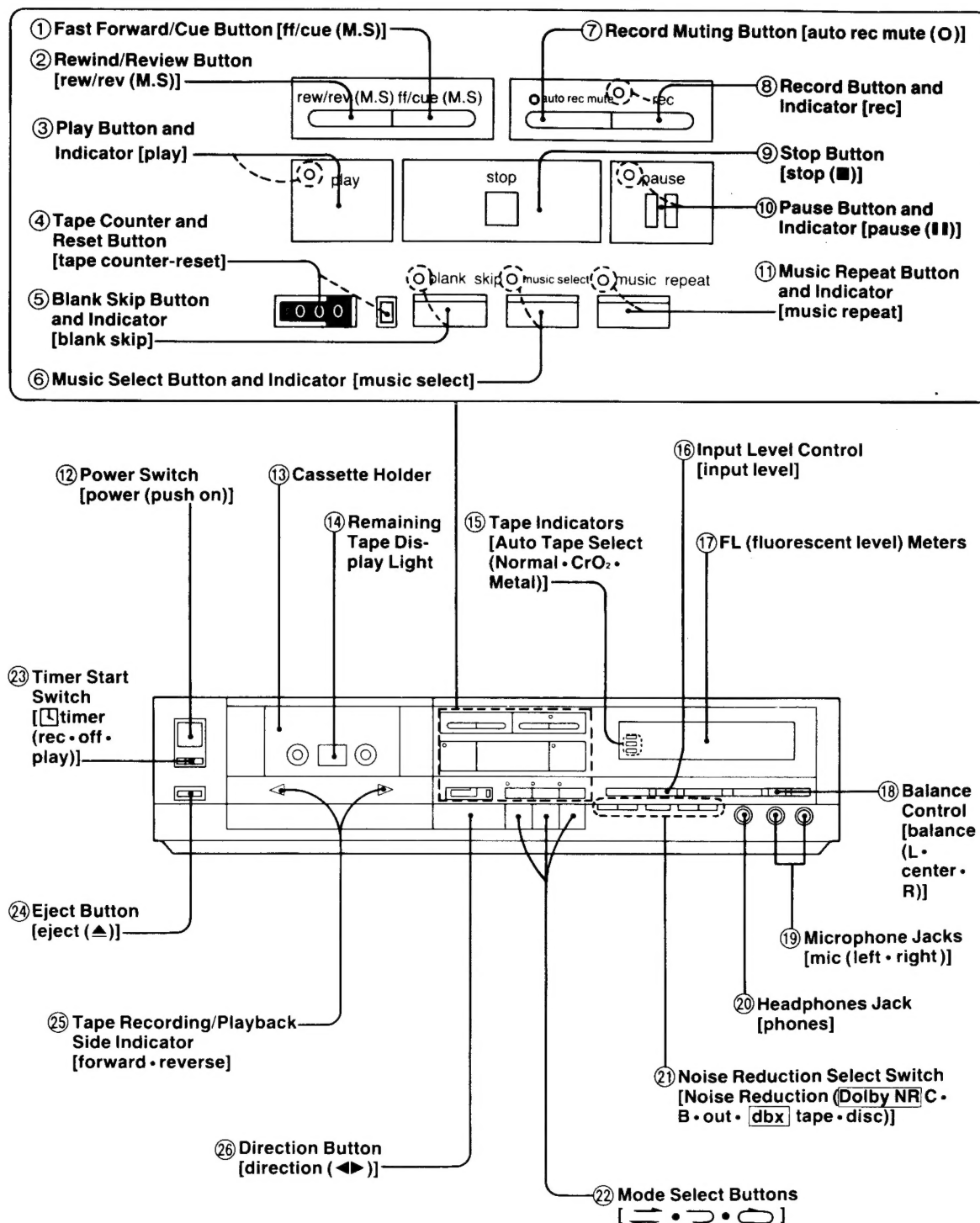
Technics

Matsushita Electric Trading Co., Ltd.
P.O. Box 288, Central Osaka Japan

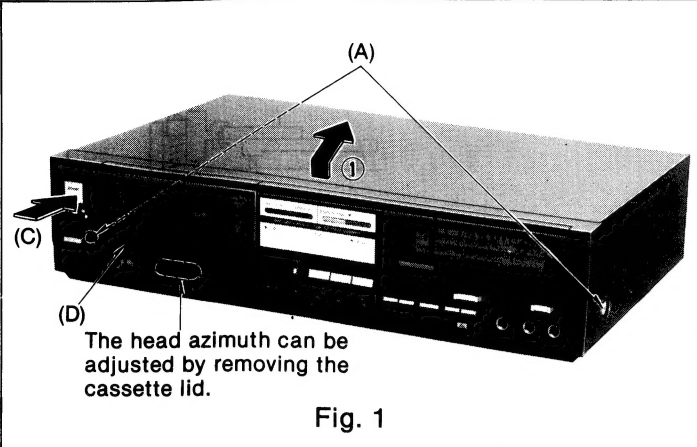
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LOCATION OF CONTROLS AND COMPONENTS



DISASSEMBLY INSTRUCTIONS



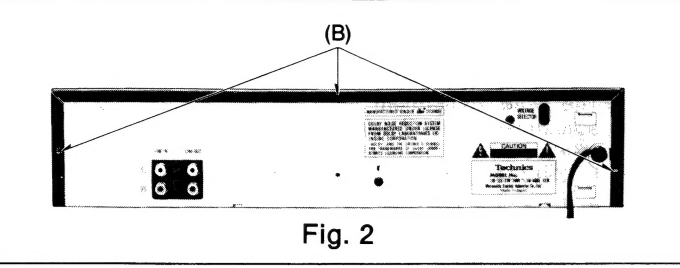
(A)

(C)

(D)

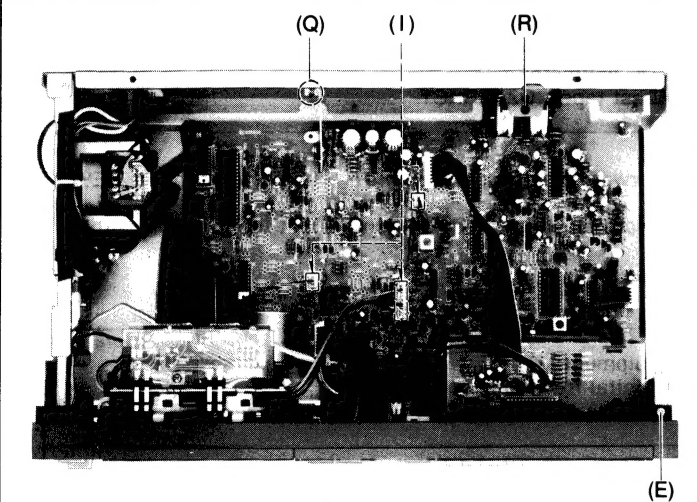
The head azimuth can be adjusted by removing the cassette lid.

Fig. 1



(B)

Fig. 2



(Q)

(I)

(R)

(E)

Fig. 3

(J) How to remove flat cable

Flat cable White line

Open the lid of connector in the direction of the arrow as shown above, and extract the flat cable to disconnect.

Connector (Flat cable connector)

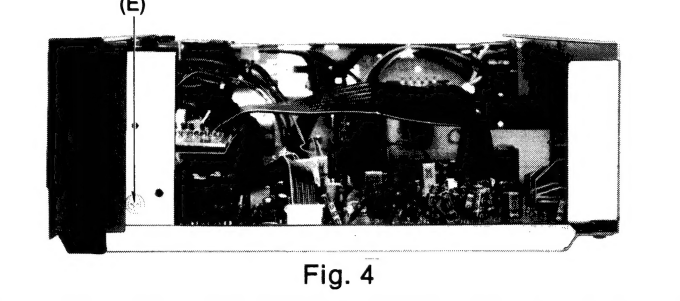
(Q) How to remove nylon rivet

Nylon rivet-B Back chassis Heat sink

Outside Inside

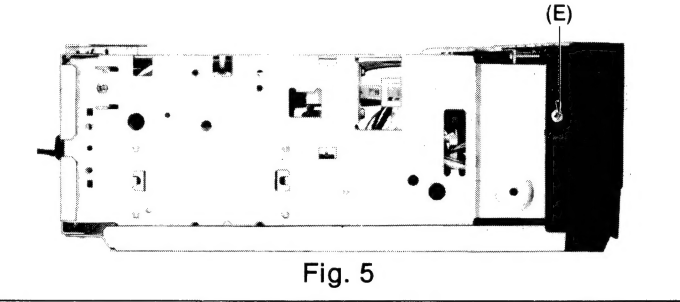
Nylon rivet-A

To remove a heat sink from the back chassis, first press nylon rivet-A from the inside in the direction indicated by the arrow as shown above, and extract the rivet to the outside. Next remove nylon rivet-B from the outside. Consequently, the heat sink can be removed from the back chassis.



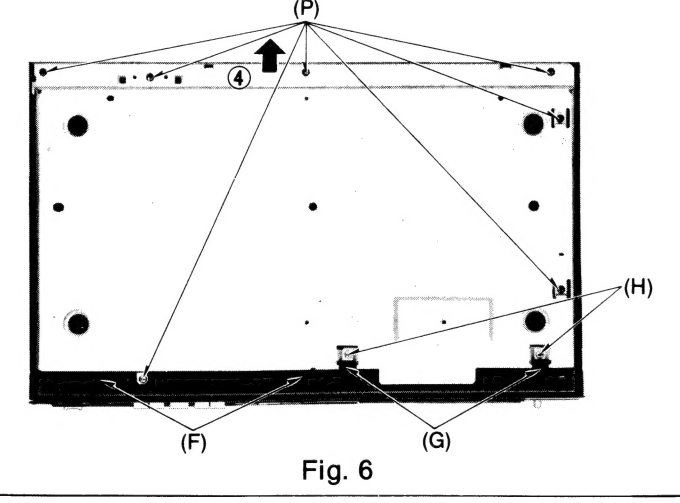
(E)

Fig. 4



(E)

Fig. 5



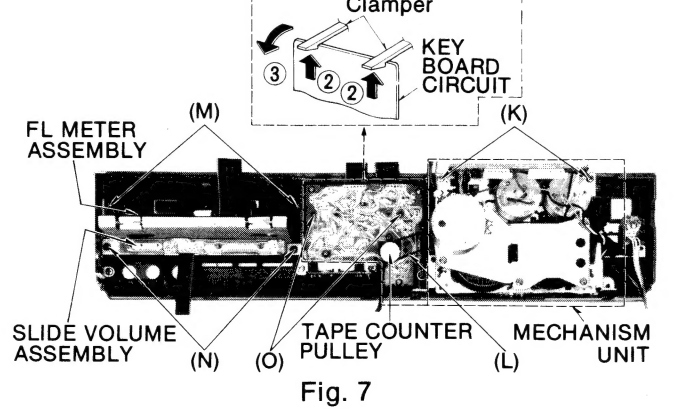
(P)

(F)

(G)

(H)

Fig. 6



(M)

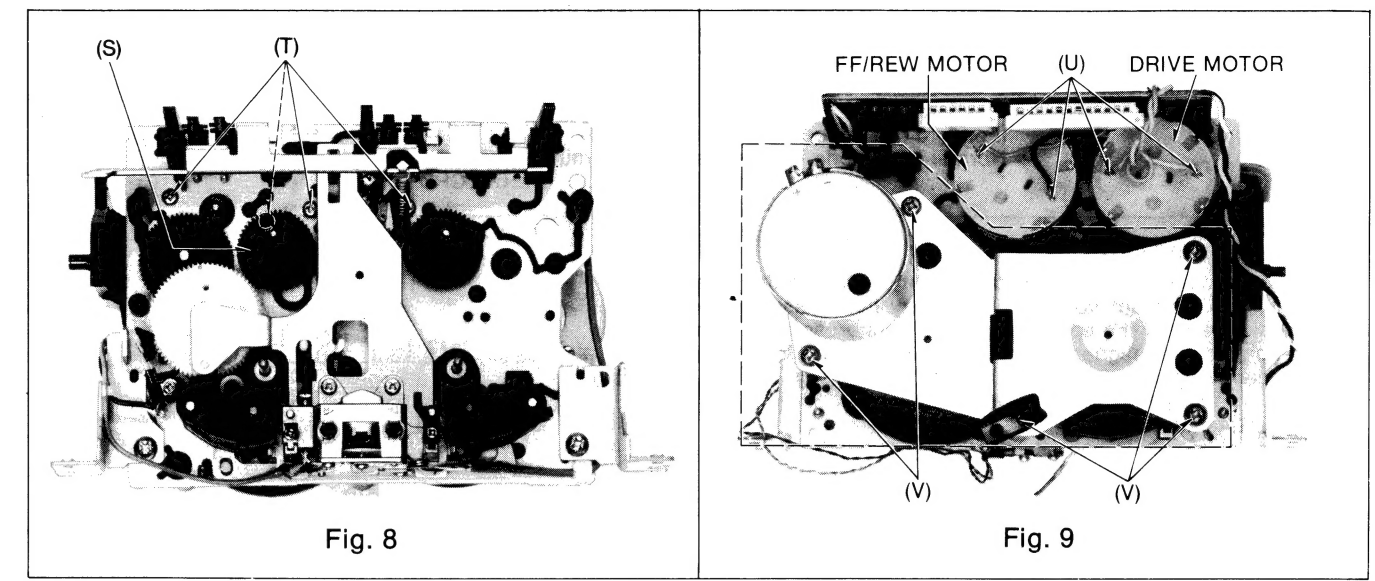
(N)

(O)

(K)

(L)

Fig. 7



Ref. No.	Procedure	To remove —	Remove —	Shown in fig. —
1	1	Case cover	• 2 ornament screws.....(A) • 3 screws .....(B) • As shown in fig. 1, pull case cover in the direction of arrow ①.	1 2 1
2	1 → 2	Front panel assembly and mechanism unit	• 3 screws .....(E) • 2 screws .....(F) • 2 screws .....(G) • 2 screws .....(H) • Pull out the connectors A F G H L .....(I) • How to remove flat cable .....(J)	3, 4, 5 6 6 6 3 3
3	1 → 3	Mechanism unit	• Push the eject button .....(C) • Cassette lid.....(D) • 2 screws .....(G) • 2 screws .....(H) • 2 screws .....(K) • Counter belt .....(L)	1 1 6 6 7 7
4	1 → 4	FL meter assembly	• 2 screws .....(M)	7
5	1 → 5	Slide volume assembly	• 2 screws .....(N)	7
6	1 → 6	Key board circuit	• 2 screws .....(O) • As shown in fig. 7, raise the clamper in the direction of arrow ② and remove the key board circuit in the direction of arrow ③.	7 7
7	7	Bottom cover	• 2 screws .....(F) • 2 screws .....(H) • 7 screws .....(P) • Slide the bottom cover in the direction arrow ④ and remove it.	6 6 6 6
8	1 → 7 → 8	Main circuit board	• How to remove nylon rivet .....(Q) • 1 screw .....(E) • 1 screw .....(R)	3 4 3
9	1 → 3 → 9	FF/REW motor and drive motor	• Remove the reel table .....(S) • 4 screws .....(T) • Unsolder the soldered portion of the FF/REW motor terminal and driver motor terminal .....(U)	8 8 9
10	1 → 3 → 10	Capstan motor	• 5 screws(V)	9

PRE

Removing the

The Mode Sel
Bushings, as
Assembly and
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Reassembling

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screws (K) o
Counter Bel
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7. Make su

Replacement

Repeat Butto

The Blank Skip
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① are melted
Ornament Plate
To remove thi
Ornament Plate
part ③ of the
seven pins ④
Fig. 2.)
As mentioned
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replaced when

Replacement

To replace the
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three LED's.
from the Base
(Refer to the F

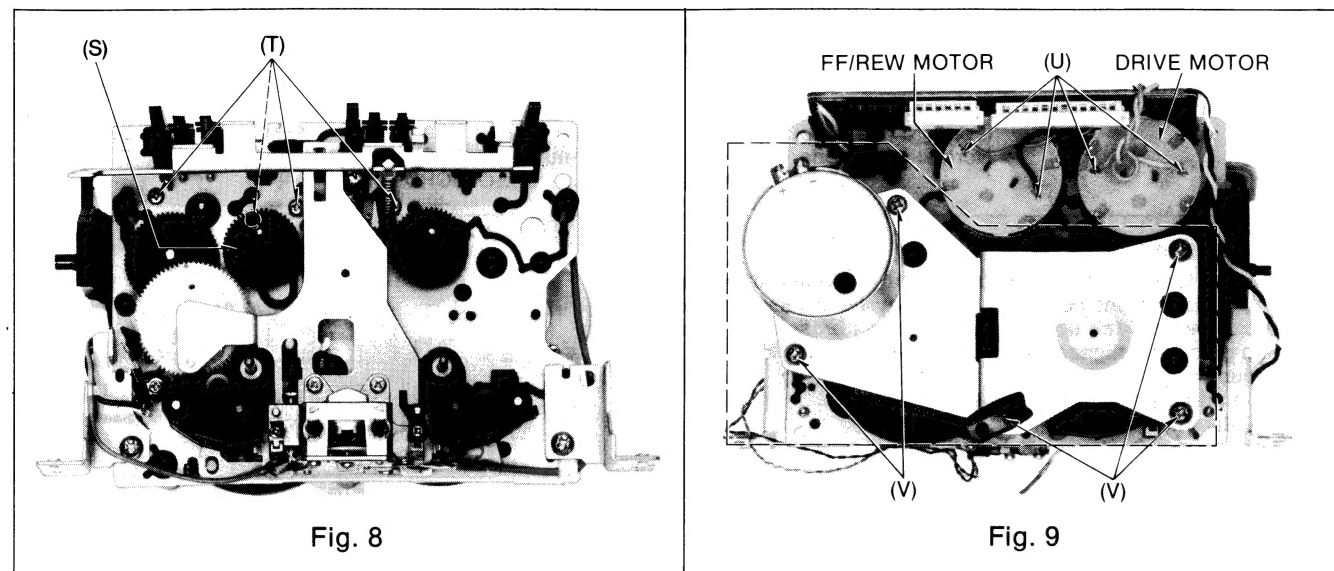


Fig. 8

Fig. 9

Ref. No.	Procedure	To remove —	Remove —	Shown in fig. —
1	1	Case cover	<ul style="list-style-type: none"> • 2 ornament screws.....(A) • 3 screws .....(B) • As shown in fig. 1, pull case cover in the direction of arrow ①. 	1 2 1
2	1 → 2	Front panel assembly and mechanism unit	<ul style="list-style-type: none"> • 3 screws .....(E) • 2 screws .....(F) • 2 screws .....(G) • 2 screws .....(H) • Pull out the connectors A F G H L .....(I) • How to remove flat cable .....(J) 	3, 4, 5 6 6 6 3 3
3	1 → 3	Mechanism unit	<ul style="list-style-type: none"> • Push the eject button .....(C) • Cassette lid.....(D) • 2 screws .....(G) • 2 screws .....(H) • 2 screws .....(K) • Counter belt .....(L) 	1 1 6 6 7 7
4	1 → 4	FL meter assembly	• 2 screws .....(M)	7
5	1 → 5	Slide volume assembly	• 2 screws .....(N)	7
6	1 → 6	Key board circuit	<ul style="list-style-type: none"> • 2 screws .....(O) • As shown in fig. 7, raise the clumper in the direction of arrow ② and remove the key board circuit in the direction of arrow ③. 	7 7
7	7	Bottom cover	<ul style="list-style-type: none"> • 2 screws .....(F) • 2 screws .....(H) • 7 screws .....(P) • Slide the bottom cover in the direction arrow ④ and remove it. 	6 6 6 6
8	1 → 7 → 8	Main circuit board	<ul style="list-style-type: none"> • How to remove nylon rivet .....(Q) • 1 screw .....(E) • 1 screw .....(R) 	3 4 3
9	1 → 3 → 9	FF/REW motor and drive motor	<ul style="list-style-type: none"> • Remove the reel table .....(S) • 4 screws .....(T) • Unsolder the soldered portion of the FF/REW motor terminal and driver motor terminal .....(U) 	8 8 9
10	1 → 3 → 10	Capstan motor	• 5 screws .....(V)	9

PRECAUTIONS IN DISASSEMBLY AND REASSEMBLY

Removing the Mode Select Button

The Mode Select Buttons are press-fit with the Button Bushings, as shown in Fig. 11, with the Front Panel Assembly and Button Springs between them. Remove the Button Bushings using pliers to disassemble these parts. Be careful not to lose the Button Springs as they will pop out.

Reassembling the Mechanism Unit

- For repair, measurement or adjustment with the mechanism removed from the unit be sure to ground the lower base plate of the mechanism. For grounding, connect a extension cord to the mechanism's lower base plate and the ground of main circuit board. Without grounding, the mechanism does not operate properly.
- Before attaching the Mechanism Unit to the Front Panel Assembly, thread the Counter Belt over the Reel Table (M18) and the 6-pin Jumper Socket Cover as shown in Fig. 12, and then secure the Mechanism Unit with two screws (K) (Refer to the Fig. 7.). Then, remove the Counter Belt from the 6-pin Jumper Socket Cover, and thread it over the Tape Counter Pulley as shown in Fig. 7. Make sure that the Counter Belt is not twisted.

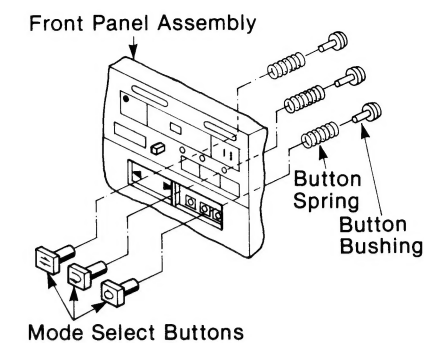


Fig. 11

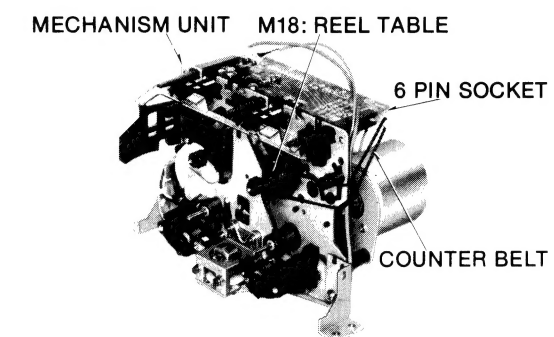


Fig. 12

PRECAUTIONS FOR PARTS REPLACEMENT

Replacement of the Blank Skip/Music Select/Music Repeat Button

The Blank Skip, Music Select and Music Repeat Buttons are a one-piece resin molded part (It is supplied as a single part.).

As shown in Fig. 1, this button is fixed in such a manner that the Front Panel Assembly is sandwiched between the Ornament Plate (G5-1) and the button (G5-2) and three pins (A) are melted by heat. (Four pins (B) are used to fix the Ornament Plate. Refer to Fig. 2.)

To remove this part, first, remove the four lugs on the Ornament Plate from the Front Panel. Then, while pulling part (C) of the Ornament Plate toward the front, heat the seven pins (A) and (B) with a soldering iron. (Refer to the Fig. 2.)

As mentioned above, this part is fixed by melting the pins by heat, both the Ornament Plate and button must be replaced when replacement is required.

Replacement of Parts on the Keyboard Circuit

To replace the parts on the keyboard circuit, first, remove the five screws (F), and then desolder six terminals (G) of three LED's. The Operation Chassis can then be removed from the Base Plate and the parts be replaced. (Refer to the Fig. 3).

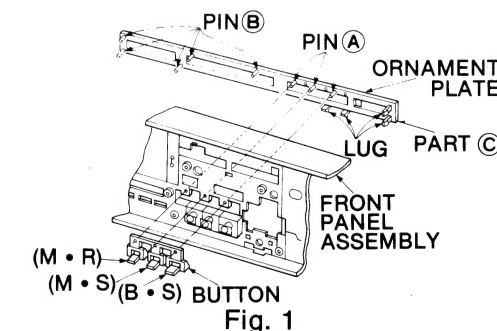


Fig. 1

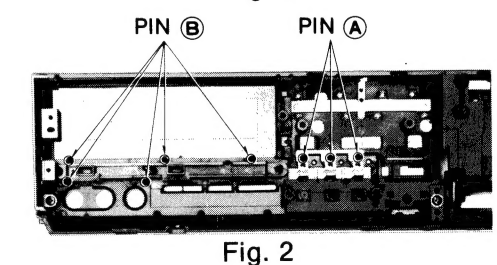


Fig. 2

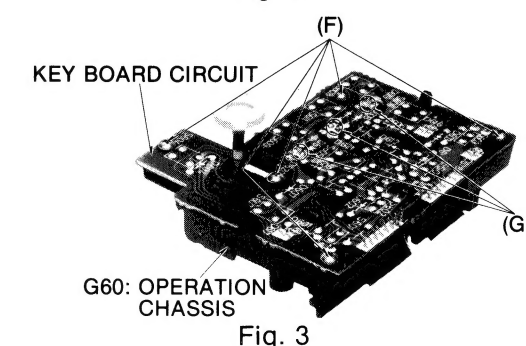


Fig. 3

REPLACING ROTARY HEAD ASSEMBLY

Considerations in mounting the rotary head assembly

1. This recorder requires a record/playback head of extremely precise head height. In replacing the rotary head, install a factory-adjusted full rotary head assembly.

[Never attempt to disassemble the rotary head assembly by removing screws (A).]

2. In installing the replacement rotary head assembly, make certain that the change gear is placed at location (B) on the change rod. (See Fig. 1.)
3. Trace the record/playback head lead-wire as follows (Refer to Fig. 2):
 - Set the record/playback head in its forward playback direction.
 - Slacken the wire between the head assembly and the mechanism angle-R (by making a 5 or 6mm turnup).

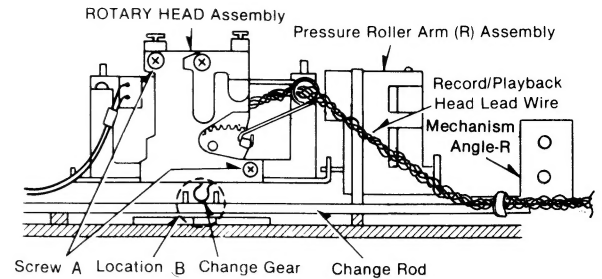


Fig. 1

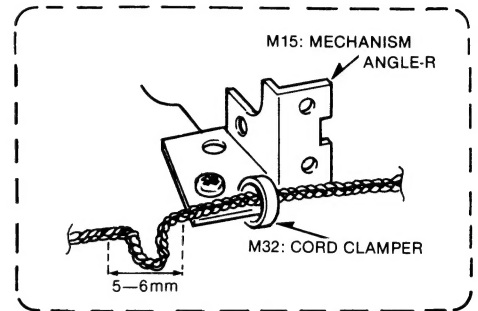


Fig. 2

MEASUREMENT AND ADJUSTMENT METHODS

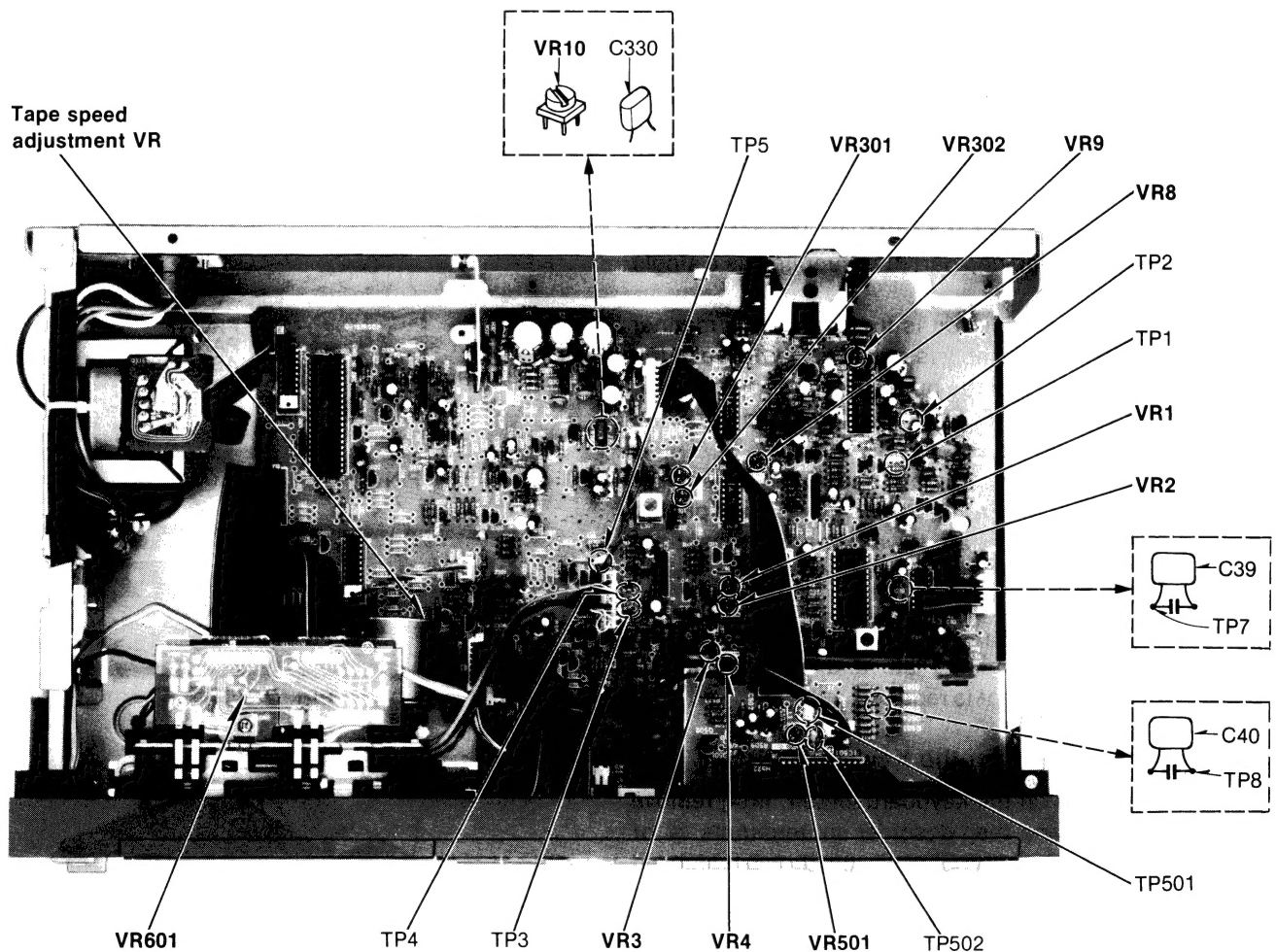


Fig. 1

NOTES: Set switches and controls in the following positions, unless otherwise specified.

- Make sure heads are clean
- Make sure capstan and pressure roller are clean
- Judgeable room temperature 20±5°C (68±9°F)
- NR switch: OUT
- Timer start switch: OFF
- Input level control: Maximum

- Mode switch: mode
- Blank skip switch: OFF
- Music select switch: OFF
- Music repeat switch: OFF

A Head adjustment

Condition:

- Playback mode (Forward • Reverse)
- Normal tape mode

Equipment:

- VTVM
- Oscilloscope
- Test tape (azimuth)...QZZCFM
- Test tapeQZZCRD

HEAD HEIGHT ADJUSTMENT

1. Turn the tape guide height adjustment screw and the erase head height adjustment screw on the rotary head assembly counter-clockwise until the upper end face of the erase head and of the tape guide are aligned on the same plane as the top face of their respective guide pins. (Refer to Figs. 2, 3 and 4).
2. Put a point ink-mark on the head of each adjustment screw.
3. With the marks as guides, turn the erase head height adjustment screw 3.2 turns clockwise and the tape guide height adjustment screw 2.5 turns clockwise.
4. Install a test tape (tape with mirror: QZZCRD) on the recorder; place the recorder in the FORWARD PLAY mode. Make fine adjustments of the erase head height and tape guide height adjustment screws as necessary, to attain on the recording/reproducing head face the tape position shown in Fig. 5.
5. Run the tape in the forward play mode and check it for zigzag running. (Shown in Fig. 5) If zigzag tape running occurs, repeat step 4.
6. Place the recorder in the reverse play mode and perform the above steps 4 and 5.
7. Repeat steps 5 and 6 two or three times and verify that the tape position shown in Fig. 5 is ensured.

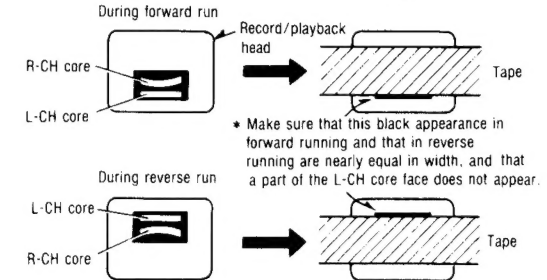
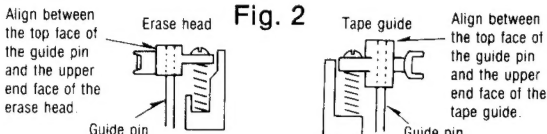
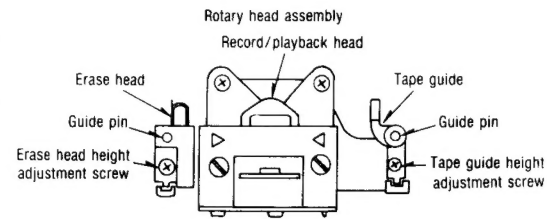


Fig. 5

L-CH/R-CH output balance adjustment

8. Make connections as shown in fig. 6.
9. In the forward playback mode, playback the 8kHz signal from the test tape (QZZCFM). Adjust the azimuth screw (Forward) shown in fig. 7 for maximum output L-CH and R-CH levels. When the output levels of L-CH and R-CH are not at maximum at the same point adjust as follows.
10. Turn the azimuth screw (Forward) shown in fig. 7 to find angles A and C (points where peak output levels for left and right channels are obtained). Then, locate angle B between angles A and C, i.e., point where L-CH and R-CH outputs are balanced. (Refer to figs. 7 and 8.)
11. In the reverse playback mode, adjust the azimuth screw (reverse) in the same way described above.

L-CH/R-CH phase adjustment

12. Make connections as shown in fig. 9.
13. In the forward playback mode, playback the 8kHz signal from the test tape (QZZCFM). Adjust the azimuth screw (Forward) shown in fig. 7 so that pointers of the two VTVMs swing to maximum and a lissajous waveform as illustrated in fig. 9-1 is obtained on the oscilloscope.
14. In the reverse playback mode, adjust the azimuth screw (reverse) in the same way described above.

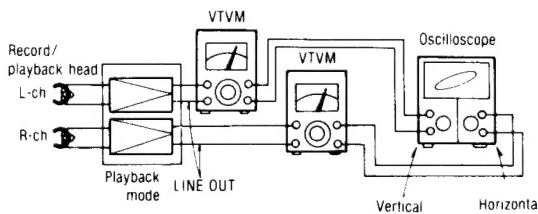


Fig. 9

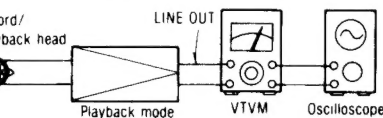


Fig. 6

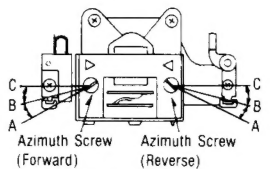


Fig. 7

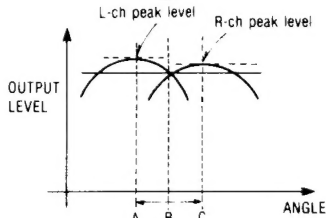


Fig. 8

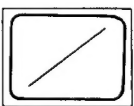


Fig. 9-1

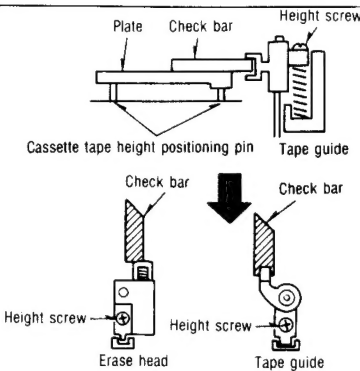
Checking the difference in level between forward and reverse running

15. Reproduce the playback level adjustment signal (315Hz at 0dB) on the standard playback adjustment tape, and check that the difference between the level in forward running and that in reverse running is within 1.0dB.
16. After adjustment, lock the erase head height, tape guide height and angle adjustment screws.

Head Height Adjustment using the Head Adjustment Jig (QZZ0207)

The head adjustment jig (QZZ0207) enables accurate, speedy head height adjustment in the following manner.

- a. Place the plate onto the mechanism.
- b. Set the mechanism to the PLAY mode.
- c. Place the check bar onto the plate.
- d. Pass the check bar through each tape guide.
- e. Adjust the height screw so that the check bar does not touch any of the tape guides.
- f. Run a mirror tape (QZZCRD) and check to see that the tape does not touch (twist around, etc.) the tape guide.
- g. After that, adjust items 4 thru 13 in the adjustment procedure.



E Takeup torque

Condition:

- Playback mode

Equipment:

- DC voltmeter
- Test tape...QZZSRKCT

1. Set the test tape (or RT-60) into the cassette holder.
2. Adjust the takeup torque adjusting potentiometer VR601 in the forward playback mode for 3.5 volts between the FF/REW motor terminals.
3. Run the QZZSRKCT takeup torque measurement tape in the forward playback mode and check that the torque is within quoted tolerance.

Standard value: 50±10gr-cm

G Tape speed

Condition:

- Playback mode

Equipment:

- Digital frequency counter
- Test tape...QZZCWAT

Tape speed accuracy

1. Test equipment connection is shown in fig. 10.
2. Playback test tape (QZZCWAT 3,000Hz), and supply playback signal to the digital frequency counter.
3. Measure this frequency.
4. On the basis of 3,000Hz, determine value by following formula:
$$\text{Tape speed accuracy} = \frac{f-3,000}{3,000} \times 100(\%)$$
 where, f = measured value
5. Take measurement at middle section of tape.

Standard value: ±1.5%

6. If measured value is not within the standard value, adjust it by using the tape speed adjustment VR shown in Fig. 1.

Tape speed fluctuation

Make measurements in same manner as above (beginning, middle and end of tape), and determine the difference between maximum and minimum values and calculate as follows:

$$\text{Tape speed fluctuation} = \frac{f_1-f_2}{3,000} \times 100(\%) \quad f_1 = \text{maximum value, } f_2 = \text{minimum value}$$

Standard value: Less than 1%

NOTE:

Please use non metal type screwdriver when you adjust tape speed on this unit.

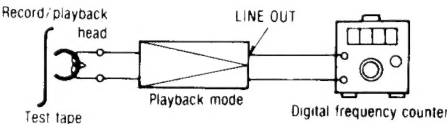


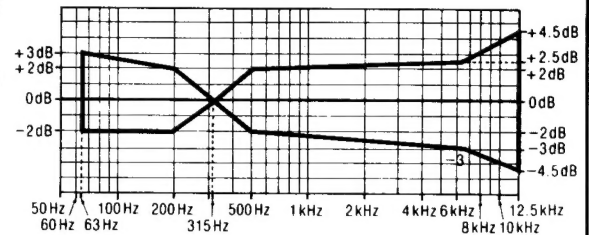
Fig. 10

D Playback frequency response

Condition:
 • Playback mode
 (Forward • Reverse)
 • Normal tape mode

Equipment:
 • VTVM
 • Oscilloscope
 • Test tape...QZZCFM

1. Test equipment connection is shown in fig. 6.
2. Playback the frequency response portion of test tape (QZZCFM).
3. Measure output level at 315Hz, 12.5kHz, 8kHz, 4kHz, 1kHz, 250Hz, 125Hz and 63Hz, and compare each output level with the standard frequency 315Hz, at LINE OUT.
4. Make measurements for both channels.
5. Make sure that the measured values are within the range specified in the frequency response chart. (Shown in fig. 11).

Playback frequency response (Forward • Reverse)**Fig. 11****E Playback gain**

Condition:
 • Playback mode
 • Normal tape mode

Equipment:
 • VTVM
 • Oscilloscope
 • Test tape...QZZCFM

1. Test equipment connection is shown in fig. 6.
2. Playback standard recording level portion on test tape (QZZCFM 315Hz) and, using VTVM, measure the output level at test points [TP7 (L-CH), TP8 (R-CH)].
3. Make measurements for both channels.

Standard value: 0.42 ± 0.05 V [around 0.28V: at test points TP7 (L-CH) and TP8 (R-CH)]

Adjustment

1. If the measured value is not within standard the adjust VR1 (L-CH) or VR2 (R-CH) (See fig. 1).
2. After adjustment, check "Playback frequency response" again.

F Erase current

Condition:
 • Record mode
 • Metal tape mode

Equipment:
 • VTVM
 • Oscilloscope

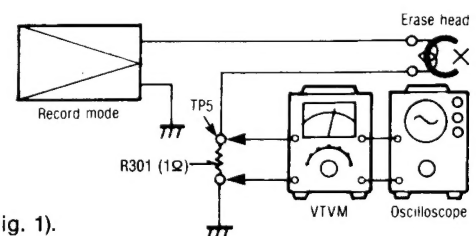
1. Test equipment connection is shown in fig. 12.
2. Place UNIT into metal tape mode.
3. Press the record and pause buttons.
4. Read voltage on VTVM and calculate erase current by following formula:

$$\text{Erase current (A)} = \frac{\text{Voltage across resistor R301}}{1 (\Omega)}$$

Standard value: 155 ± 15 mA (Metal)

Adjustment

- If the measured value is not within standard value, adjust VR10 (shown in fig. 1).

**Fig. 12**

⑥ Overall frequency response

Condition:

- Record/playback mode
- Normal tape mode
- CrO₂ tape mode
- Metal tape mode
- Input level control...MAX

Equipment:

- VTVM
- ATT
- AF oscillator
- Oscilloscope
- Resistor (600Ω)

• Test tape
(reference blank tape)
...QZZCRA for Normal
...QZZCRX for CrO₂
...QZZCRZ for Metal

Note:

Before measuring and adjusting, the overall frequency response make sure of the playback frequency response (For the method of measurement, please refer to the playback frequency response).

(Recording equalizer is fixed)

1. Make connections as shown in fig. 13.
2. Place UNIT into normal tape mode and insert the normal reference blank test tape (QZZCRA).
3. Supply a 1kHz signal from the AF oscillator through ATT to LINE IN.
4. Adjust ATT so that input level is -20dB below standard recording level (standard recording level = 0 VU).
5. Adjust the AF oscillator frequency to 1kHz, 50Hz, 100Hz, 200Hz, 500Hz, 4kHz, 8kHz, 10kHz and 12.5kHz signals, and record these signals on the test tape.
6. Playback the signals recorded in step 5, and check if the frequency response curve is within the limits shown in the overall frequency response chart for normal tapes (fig. 14).
(If the curve is within the charted specifications, proceed to steps 7, 8 and 9.)
If the curve is not within the charted specifications, adjust as follows;

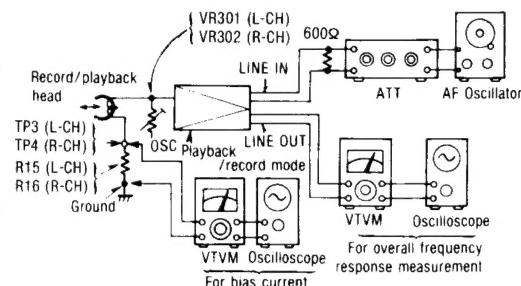


Fig. 13

Overall frequency response chart (Normal)

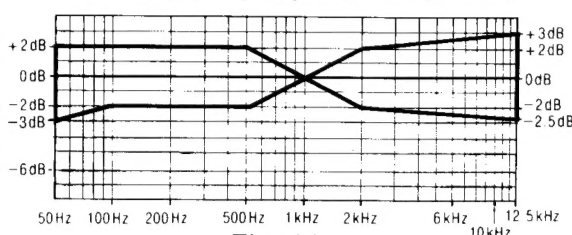


Fig. 14

Adjustment (A):

When the curve exceeds the overall specified frequency response chart (fig. 14) as shown in fig. 15.

- 1) Increase bias current by turning VR301 (L-CH) and VR302 (R-CH).
(See fig. 1 on page 6.)
- 2) Repeat steps 5 and 6 for confirmation (Proceed to steps 7, 8 and 9 if the curve is now within the charted specifications as shown fig. 14.)
- 3) If the curve still exceeds the specifications (fig. 14), increase bias current further and repeat steps 5 and 6.

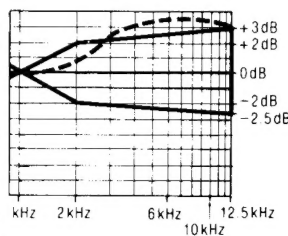


Fig. 15

Adjustment (B):

When the curve falls below the overall specified frequency response chart (fig. 14) as shown in fig. 16.

- 1) Reduce bias current by turning VR301 (L-CH) and VR302 (R-CH).
- 2) Repeat steps 5 and 6 for confirmation (Proceed to steps 7, 8 and 9 if the curve is now within the charted specifications as shown fig. 14.)
- 3) If the curve still falls below the charted specifications (fig. 14), reduce bias current further and repeat steps 5 and 6.

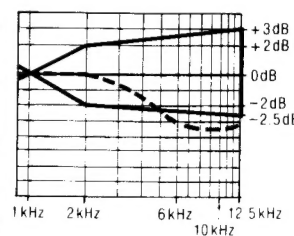


Fig. 16

7. Place UNIT into CrO₂ tape mode.
8. Change test tape to CrO₂ reference blank test tape (QZZCRX), and record 1kHz, 50Hz, 100Hz, 200Hz, 500Hz, 4kHz, 8kHz, 10kHz and 15kHz signals. Then, playback the signals and check if the curve is within the limits shown in the overall frequency response chart for CrO₂ tapes (fig. 17).
9. Place UNIT into metal tape mode and change test tape to metal reference blank test tape (QZZCRZ), and record 1kHz, 50Hz, 100Hz, 200Hz, 500Hz, 4kHz, 8kHz, 10kHz, 12.5kHz and 15kHz signals. Then, playback the signals and check if the curve is within the limits shown in the overall frequency response chart for metal tapes (fig. 17).
10. Confirm that bias currents are approximately as follows when the UNIT is set at different tape mode.

- Read voltage on VTVM between ground and test point (TP3 for L-CH, TP4 for R-CH) and calculate bias current by following formula:

$$\text{Bias current (A)} = \frac{\text{Value read on VTVM (V)}}{10 (\Omega)}$$

around 200μA (Normal position)
Standard value: around 300μA (CrO₂ position)
around 400μA (Metal position)

Overall frequency response chart (CrO₂, Metal)

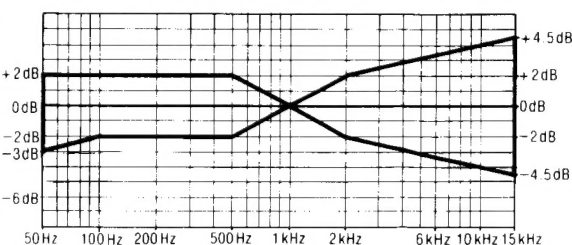


Fig. 17

Overall gain

Condition:

- Record/playback mode
- Normal tape mode
- Input level controls...MAX
- Standard input level;
MIC -72 ± 4 dB
LINE IN -24 ± 4 dB

Equipment:

- VTVM
- AF oscillator
- ATT
- Oscilloscope
- Resistor (600 Ω)
- Test tape
(reference blank tape)
...QZZCRA for Normal

1. Test equipment connection is shown in fig. 18.
2. Insert the normal reference blank tape (QZZCRA).
3. Place UNIT into record mode.
4. Supply a 1 kHz signal through ATT (-24 dB) from AF oscillator, to LINE IN.
5. Adjust ATT until monitor level at LINE OUT becomes 0.42 V.
6. Playback recorded tape, and make sure that the output level at LINE OUT becomes 0.42 V.
7. If measured value is not $0.42 \text{ V} \pm 2 \text{ dB}$, adjust it by using VR3 (L-CH) or VR4 (R-CH).
8. Repeat from step (2).

Standard value: $0.42 \text{ V} \pm 2 \text{ dB}$
[around 0.28 V : at test points TP7 (L-CH) and TP8 (R-CH)]

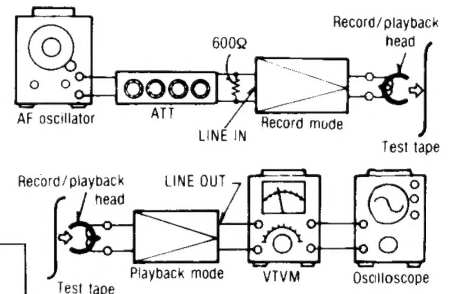


Fig. 18

Dolby NR circuit

Condition:

- Record mode
- Dolby NR switch...IN/OUT
- Dolby NR select switch...B/C
- Input level control...MAX

- Output level control...MAX
- Balance control...Center

Equipment:

- VTVM
- AF oscillator
- ATT
- Oscilloscope
- Resistor (600 Ω)

Record side

- Check of the Dolby-B type encoder characteristics

1. Make connections as shown in fig. 19.
 2. Set the unit to the record mode. (NR select switch is OUT.)
 3. Apply a 1 kHz signal to LINE IN.
 4. Adjust the ATT so that the output level at TP7 (L-CH) and TP8 (R-CH) is 12.3 mV .
 5. The output level at pin 14 should be 0 dB .
 6. Set the NR select switch to B, and make sure that the output signal level at pin 14 of IC3 (L-CH) and IC4 (R-CH) is $+6 \text{ dB} \pm 2.5 \text{ dB}$.
 7. Set the NR select switch to OUT, and adjust the frequency to 5 kHz . The output signal level at pin 14 should be 0 dB .
 8. Set the NR select switch to B and make sure that the output signal level at pin 14 of IC3 (L-CH) and IC4 (R-CH) is $+8 \text{ dB} \pm 2.5 \text{ dB}$.
- Check to Dolby-C type encoder characteristics
9. Repeat steps 1-5 above.
 10. Set the NR select switch to C and make sure that the output signal level at pin 14 of IC3 (L-CH) and IC4 (R-CH) is $+11.5 \text{ dB} \pm 2.5 \text{ dB}$.
 11. Set the NR select switch to OUT and adjust the frequency to 5 kHz . The output signal at pin 14 should be 0 dB .
 12. Set the NR select switch to C and make sure that the output signal level at pin 14 of IC3 (L-CH) and IC4 (R-CH) is $+8.5 \text{ dB} \pm 2.5 \text{ dB}$.

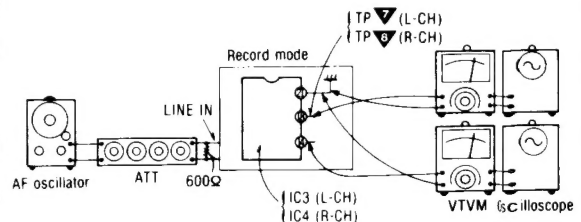


Fig. 19

Attack recovery time adjustment (dbx circuit)

Condition:

- Record mode
- Input level control...MAX
- Noise reduction selector
...dbx tape

Equipment:

- VTVM
- ATT
- AF oscillator
- DC voltmeter

1. Make the connections as shown in fig. 20 and apply $1 \text{ kHz} -27 \text{ dB}$ signal from LINE IN, and set the noise reduction selector to dbx tape position.
2. Set the unit to record mode, adjust ATT so that the signal level at C107 (L-CH) and C108 (R-CH) is 300 mV .
3. Read voltage on DC voltmeter.

Reference value: $15 \pm 0.5 \text{ mV}$

4. If measured value is not within reference, adjust VR9 (shown in fig. 1).

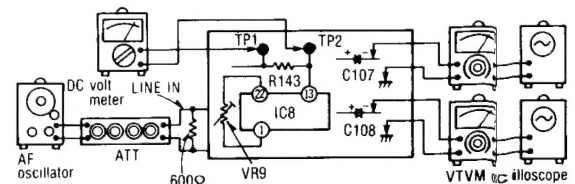


Fig. 20

K Input scanning time adjustment

Condition:
• Stop mode

Equipment:
• Oscilloscope

1. Place the recorder in the stop mode.
2. Connect an oscilloscope to pin 31 of IC601, as shown in Fig. 21.
3. If the measured value is not within standard value, correct it by opening or closing the jumper junctions (A) and (B) as follows (See Fig. 22):
After closing (A) and opening (B), read the resulting value.
 - If it is less than 70Hz, close (B).
 - If more than 120Hz, open (A) but close (B).
 - If opening (A) and closing (B) do not cause the reading to be less than 120Hz, open both (A) and (B).

Standard value: $100 + \frac{20}{30}$ Hz (pulse frequency)

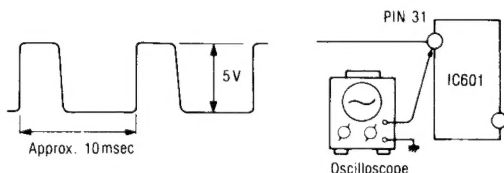


Fig. 21

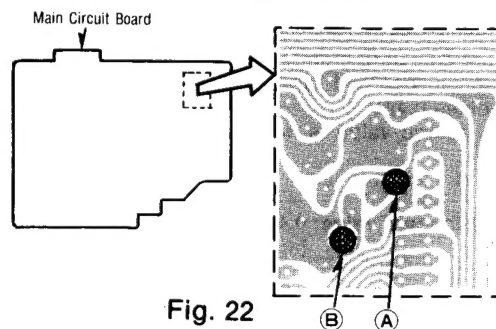


Fig. 22

L Fluorescent meter

Condition:
• Record mode
• Input level controls...MAX

Equipment:
• VTVM
• ATT
• AF oscillator

• Check for FL meter

To check the accuracy of the FL meter, measure the output level at test point [TP7 (L-CH), TP8 (R-CH)].

1. Make connections as shown (See fig. 23).
2. Connect a wire between TP501 and TP502 terminal (See fig. 24).
3. In the recording pause mode, apply 1kHz (-24dB) to LINE IN.
4. Adjust ATT so that output level at test point [TP7 (L-CH), TP8 (R-CH)] is 0.28V.

Checking FL meter 0dB segment display ON/OFF

Change the output level at test point [TP7 (L-CH), TP8 (R-CH)] from 0.28V -1dB ($\approx 250\text{mV}$) to 0.28V +1dB ($\approx 310\text{mV}$) by adjusting the attenuator, and check that the FL meter 0dB segment display OFF state changes to the ON state.

Checking FL meter -40dB segment display ON/OFF

Lower the signal level 28dB below the standard input level (-24dB-28dB=-52dB $\approx 2.5\text{mV}$) and then further lower the level 12dB (-52dB-12dB=-64dB $\approx 0.63\text{mV}$) by adjusting the attenuator. While lowering the level as described above, make sure that only the -40dB display remains lit the dims or goes off at the lowest level.

• Adjustment for FL meter

1. Make connections as shown (See fig. 23).
2. Connect a wire between TP501 and TP502 terminal (See fig. 24).
3. In the recording pause mode, apply 1kHz (-24dB) to LINE IN.
4. Adjust ATT so that output level at test point [TP7 (L-CH), TP8 (R-CH)] is 0.28V.

-40dB adjustment

5. Adjust ATT so that the level adjusted at step 4 is reduced by 40dB.
6. At this time, check that -40dB indicator is dimmed (intermediate brightness between full brightness and light-out: See fig. 25).
7. If the indicator is not lighted halfway as described in step 6, adjust VR8.

0dB adjustment

8. Restore the condition of step 4 (set output level to 0.28V at test point [TP7 (L-CH), TP8 (R-CH)]).
9. At this time, check that 0dB indicator is dimmed (intermediate brightness between full brightness and light-out: See fig. 26).
10. If improper, adjust VR501.
11. Repeat adjustments at steps 4, 5, 6, 7, 8, 9 and 10 two or three times.
12. Disconnect the wire between TP501 and TP502 terminal, which had been connected at step 2.

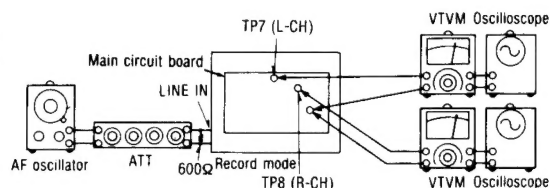


Fig. 23

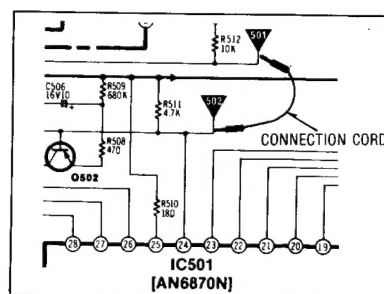


Fig. 24

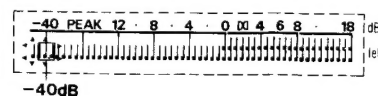


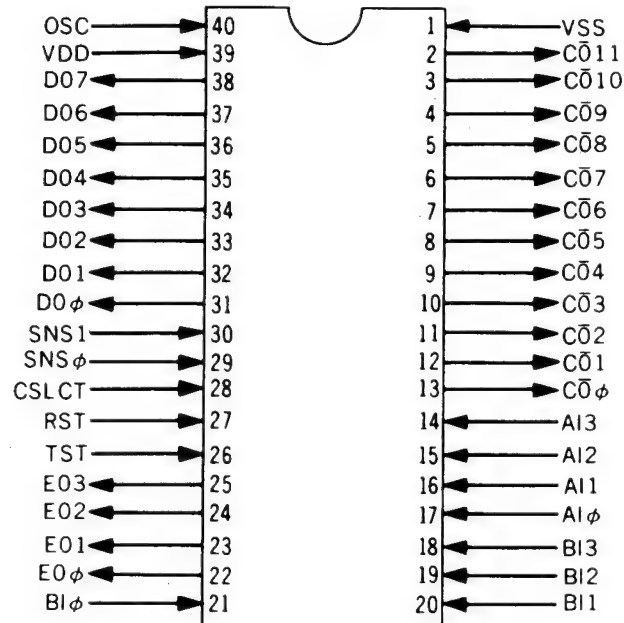
Fig. 25

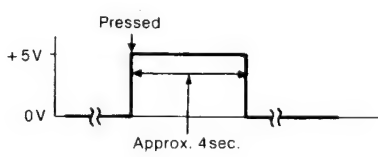
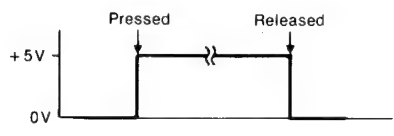
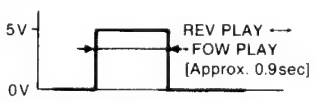


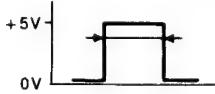
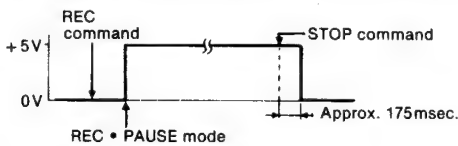
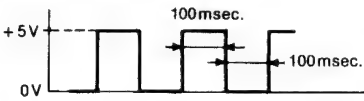
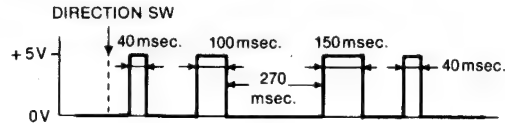
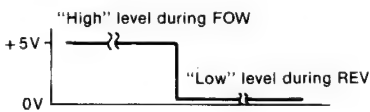
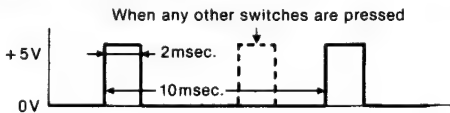
Fig. 26

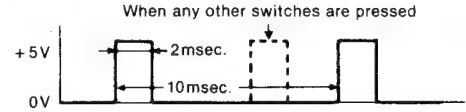
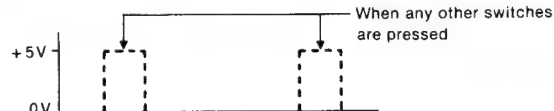
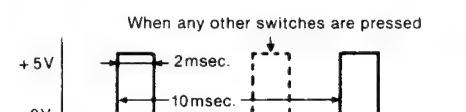
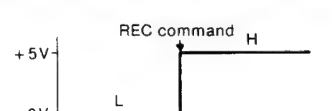
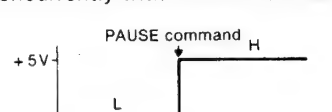
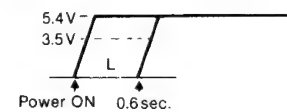
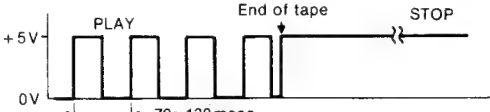
MICROCOMPUTER TERMINAL FUNCTION AND WAVEFORM (IC601: MN1405RMS)

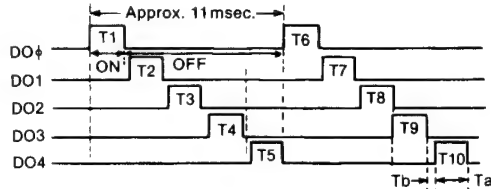
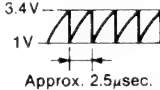
(BOTTOM VIEW)



Terminal No.	Symbol	Name	Function/operation
1.	VSS	GND	
2.	CO11	Music select (M.S) command	<ul style="list-style-type: none"> • "High" level with music select at ON.
3.	CO10	Blank skip (B.S) command	<ul style="list-style-type: none"> • "High" level with blank skip at ON.
4.	CO9	Music repeat (M.R) command	<ul style="list-style-type: none"> • "High" level with music repeat at ON.
5.	CO8	REC MUTE	<ul style="list-style-type: none"> • "High" level pulse with REC MUTE button pressed during REC PLAY. 
6.	CO7	CUE/REVIEW MUTE	<ul style="list-style-type: none"> • "High" level pulse with CUE/REVIEW button pressed during PLAY. 
7.	CO6	Drive motor CCW rotation command	<ul style="list-style-type: none"> • "High" level pulse in each mode in operational sequence REV PLAY → PAUSE → STOP → FOW PLAY. • During switching between REV PLAY and FOW PLAY. 







Terminal No.	Symbol	Name	Function/operation
8.	CO5	Drive motor CW rotation command	<ul style="list-style-type: none"> • "High" level pulse in each mode in operational sequence FOW PLAY → PAUSE → STOP → REV PLAY. 
9.	CO4	Muting for all amplifiers	<ul style="list-style-type: none"> • "High" level during FF, REW and STOP. • "Low" level during REC, PLAY and CUE/REV.
10.	CO3	Bias oscillation ON/OFF	<ul style="list-style-type: none"> • Goes to "High" immediately after REC or PAUSE operation. • Remains in "High" during REC or PLAY operation. • Goes to "Low" approximately 175msec after the STOP command is given. 
11.	CO2	FF/REW motor rotation select (FF/REW motor CCW rotation command)	<ul style="list-style-type: none"> • "High" level during: <ul style="list-style-type: none"> FOW PLAY FOW FF REV REW
12.	CO1	FF/REW motor rotation select (FF/REW motor CW rotation command)	<ul style="list-style-type: none"> • "High" level during: <ul style="list-style-type: none"> REV PLAY REV FF FOW REW
13.	COφ	FF and REW blinking-indication command	<ul style="list-style-type: none"> • "High" level during FF and REW. 
14.	AI3	Reading of input switch state CAM B (S606)	<ul style="list-style-type: none"> • Input in switching-over from FOW PLAY to REV PLAY. 
15.	AI2	Reading of input switch state CAM A (S605)	
16.	AI1	Connection to + B (bias)	
17.	AIφ	Reading of input switch state REC INH	<ul style="list-style-type: none"> • "High" level when a tape not prepared with miserase prevention masking is loaded. • "Low" level with the cassette lid open.
18.	BI3	Reading of input switch state DIR	<ul style="list-style-type: none"> • Waveform when the cassette lid is closed with no tape loading. 

Terminal No.	Symbol	Name	Function/operation
19.	BI2	Reading of input switch state REC • PLAY	<ul style="list-style-type: none"> Waveform when the cassette lid is closed with no tape loading. 
20.	BI1	Reading of input switch state BS • PAUSE • FF	<ul style="list-style-type: none"> Waveform when the cassette lid is closed with no tape loading. 
21.	BIφ	Reading of input switch state BS • PAUSE • FF	<ul style="list-style-type: none"> Waveform when the cassette lid is closed with no tape loading. 
22.	EOφ	REC indication output	<ul style="list-style-type: none"> "High" level concurrently with REC command. In TIMER REC mode, "High" level just after power on. In TIMER REC mode, "High" level remains unchanged even if the automatic stop reset mechanism operates with power on. 
23.	EO1	PAUSE indication output	<ul style="list-style-type: none"> "High" level concurrently with PAUSE command. 
24.	EO2	Reel takeup torque selection and blank skip LED indication	<ul style="list-style-type: none"> "High" level during PLAY. "Low" level during FF, REW and STOP.
25.	EO3	DIRECTION indication output	<ul style="list-style-type: none"> "Low" level during FORWARD. "High" level during REVERSE.
26.	—	—	<ul style="list-style-type: none"> Connection to GND.
27.	RST	Reset terminal	<ul style="list-style-type: none"> Terminal for reset signal to computer. Reset at "Low" level (less than 0.8 volts). 
28.	CSLCT	—	<ul style="list-style-type: none"> Non connection.
29.	SNSφ	End-of-tape detection	

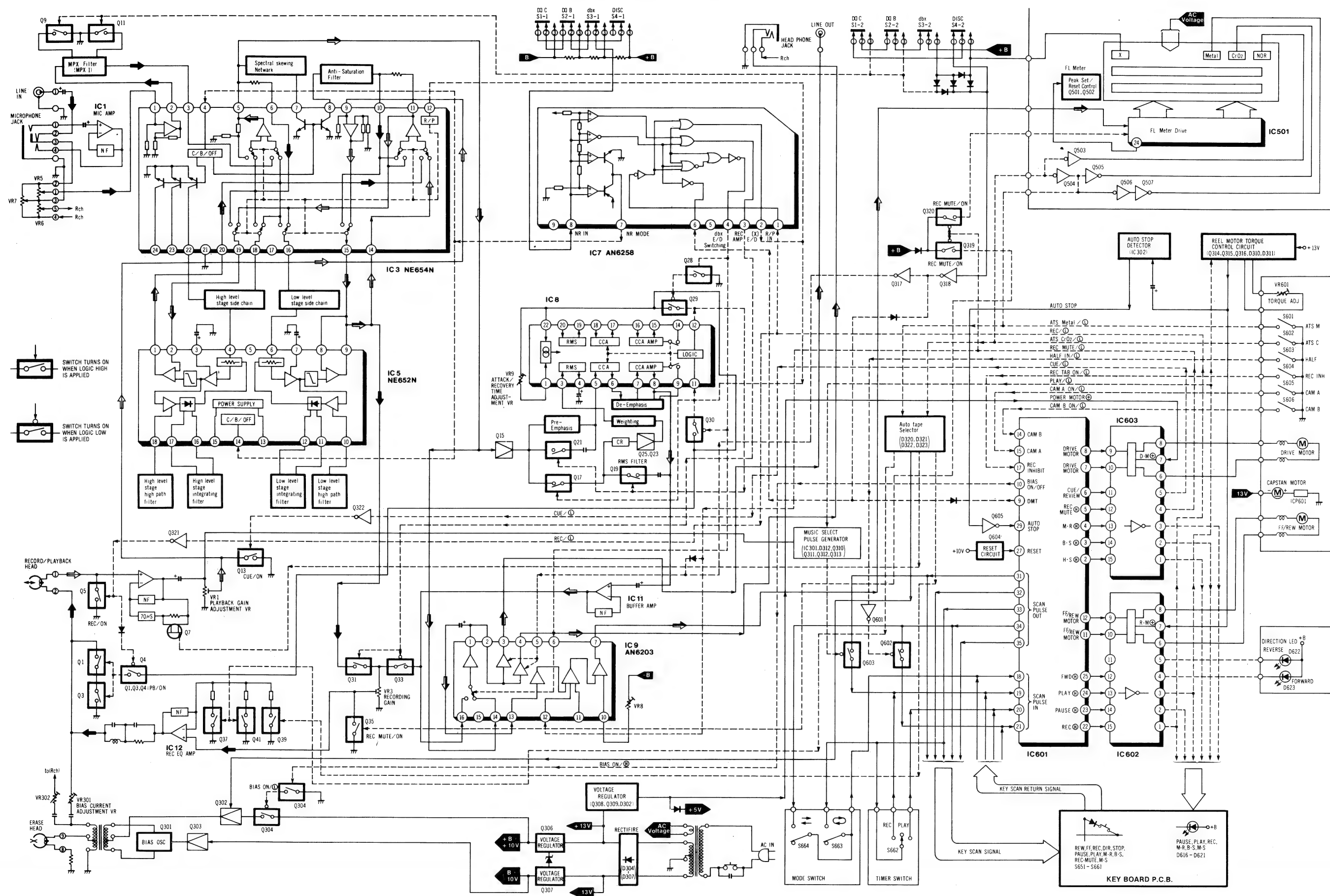
Terminal No.	Symbol	Name	Function/operation
30.			<ul style="list-style-type: none"> Non connection.
31.	DOφ	Input switch scanning	 <p>Pulse width: Ta = Approx. 2.0msec, Tb = Approx. 100μsec.</p>
32.	DO1		
33.	DO2		
34.	DO3		
35.	DO4		
36.	DO5		<ul style="list-style-type: none"> Non connection.
37.	DO6		
38.	DO7		
39.	VDD	Power supply terminal	<ul style="list-style-type: none"> Operative on 4.6 to 6.0 volts (typically 5.5 volts).
40.	OSC	Oscillation terminal	<ul style="list-style-type: none"> Generates oscillation at approximately 600kHz. Because the connection of a probe affects the terminal, nothing should be connected to this terminal for any other measurements. Use DOφ to 4 in measuring the computer's velocity; Approx. 125Hz in STOP condition. 

NOTES:

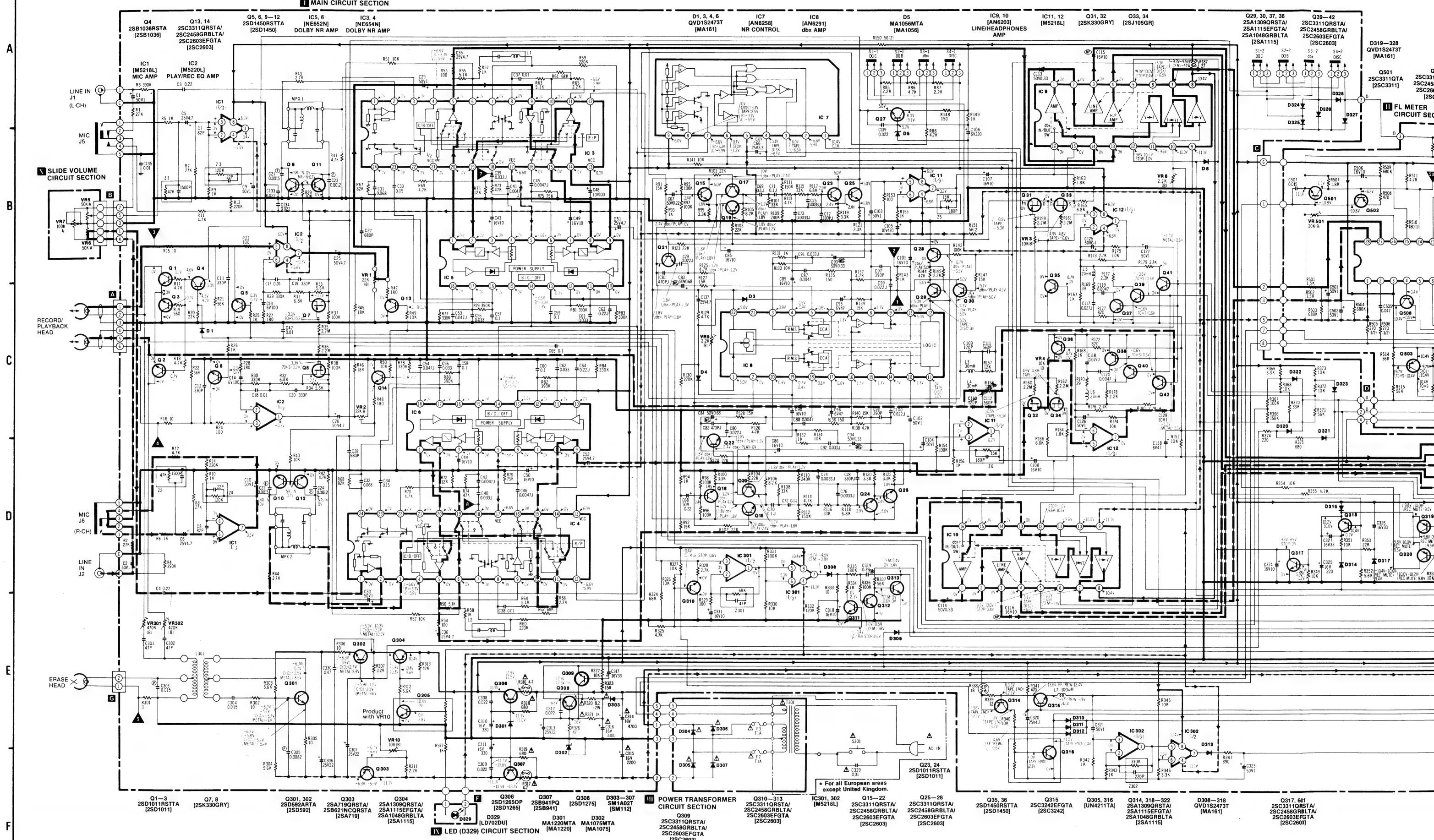
- S1-1, S1-2Dolby-C IN/OUT switch (shown in OUT position).
- S2-1, S2-2Dolby-B IN/OUT switch (shown in OUT position).
- S3-1, S3-2dbx "Tape" IN/OUT switch (shown in OUT position).
- S4-1, S4-2dbx "Disc" IN/OUT switch (shown in OUT position).
- S301Power ON/OFF switch (shown in OFF position).
- S302AC power voltage select switch.
- S601Auto tape select switch (for Metal tape).
- S602Auto tape select switch (for CrO₂ tape).
- S603Half switch (shown in OFF position).
- S604REC inhibit switch (shown in OFF position).
- S605Forward/Reverse detection switch (shown in OFF position).
- S606Mode detection switch (shown in OFF position).
- S651Rewind switch (shown in OFF position).
- S652F.F switch (shown in OFF position).
- S653Record switch (shown in OFF position).
- S654Direction switch (shown in OFF position).
- S655Stop switch (shown in OFF position).
- S656Pause switch (shown in OFF position).
- S657Play switch (shown in OFF position).
- S658Music repeat switch (shown in OFF position).
- S659Blank Skip switch (shown in OFF position).
- S660Rec Mute switch (shown in OFF position).
- S661Music select switch (shown in OFF position).
- S662Timer switch (shown in 1 position).
- (1...TIMER REC, 2...OFF, 3...TIMER PLAY)
- S663, S664Mode selection switch (1 / 2 / 3).

- VR1, 2Playback gain adjustment VR.
- VR3, 4Overall gain adjustment VR.
- VR5, 6Input level controls.
- VR7Balance control.
- VR8FL meter adjustment VR (-40dB indication).
- VR9Attack recovery time adjustment VR.
- VR10Erase current adjustment VR.
- VR301, 302Bias current adjustment VR.
- VR501FL meter adjustment VR (0dB indication).
- VR601Takeup torque adjustment VR.
- ()This symbol indicates the PNP switching transistor.
- ()This symbol indicates the NPN switching transistor.
- () this arrow indicates the flow of the recording signal. (NR OUT).
- () this arrow indicates the flow of the playback signal. (NR OUT).
- () this arrow indicates the flow of the recording signal and playback signal combination.
- () this arrow indicates the flow of the control signal.





BLOCK DIAGRAM




SCHEMATIC DIAGRAM



ELECTRICAL PARTS LIST

- All voltage values shown in circuitry are under no signal condition and playback mode with volume control at minimum position otherwise specified.
 - ()Voltage values at record mode.
 - TapeVoltage values at dbx tape mode.
 - discVoltage values at dbx disc mode.
 - CrO₂Voltage values at CrO₂ tape mode.
 - MetalVoltage values at Metal tape mode.
 - StopVoltage values at Stop mode.
 - C/RVoltage values at CUE/REV mode.
 - FF/REWVoltage values at FF/REW mode.
 - REC MUTEVoltage values at REC MUTE mode.
 - 70μsVoltage values at CrO₂ or Metal tape mode.
 - NR INVoltage value at which the noise reduction switch is turned on.
 - BVoltage values at Dolby-B mode.
 - CVoltage values at Dolby-C mode.
 - MSVoltage values at music select mode.
 - BSVoltage values at blank skip mode.
 - MRVoltage values at music repeat mode.
 - CFMVoltage value at which the test tape QZZCFM (315Hz/0dB) is played.
 - SegmentVoltage value at which the corresponding FL meter segment is lit.
 - POWER ONVoltage value at which the power source is on.
 - TAPE ENDVoltage at the end of the cassette tape.
 - S603: OFFVoltage at which the S603 switch is off.
- For measurement use VTMV.
 - () indicates B + (bias).
 - () indicates B - (bias).
 - () indicates the flow of the playback signal. (NR out).
 - () indicates the flow of the recording signal. (NR out).
- Important safety notice

Components identified by  mark have special characteristics important for safety. When replacing any of these components, use only manufacturer's specified parts.
- Described in the schematic diagram are two types of numbers; the supply parts numbers and production parts number for transistors and diodes. One type of number is used for supply parts number and production parts number when they are identical.

e.g. Q1
 2SC1844(E,F) — Production parts number
 [2SC1844E] — Supply parts number
 D212
 1S2473T77 — Production parts number
 [MA161] — Supply parts numbers
- The supply parts number is described alone in the replacement parts list.

SPECIFICATIONS

Playback S/N ratio * Test tape...QZZCFM	Greater than 45dB
Overall distortion * Test tape ...QZZCRA for Normal ...QZZCRX for CrO ₂ ...QZZCRZ for Metal	Less than 4%
Overall S/N ratio * Test tape...QZZCRA	Greater than 43dB (without NAB filter)

- * Input level control...MAX
- * Balance control.....Center

NOTES: RESISTORS

ERD	Carbon
ERG	Metal-oxide
ERS	Metal-oxide
ERO	Metal-film
ERX	Metal-film
ERQ	Fuse type metallic
ERC	Solid
ERE	Cement

CAPACITORS

ECBA	.....Ceramic
ECG□	.....Ceramic
ECK□	.....Ceramic
ECM□	.....Ceramic
ECF□	.....Ceramic
ECQM	.....Polyester film
ECQE	.....Polyester film
ECQF	.....Polypropylene
ECED	.....Electrolytic
ECEN	.....Non polar electrolytic
ECQS	.....Polystyrene
ECSD	.....Tantalum
QCS	.....Tantalum

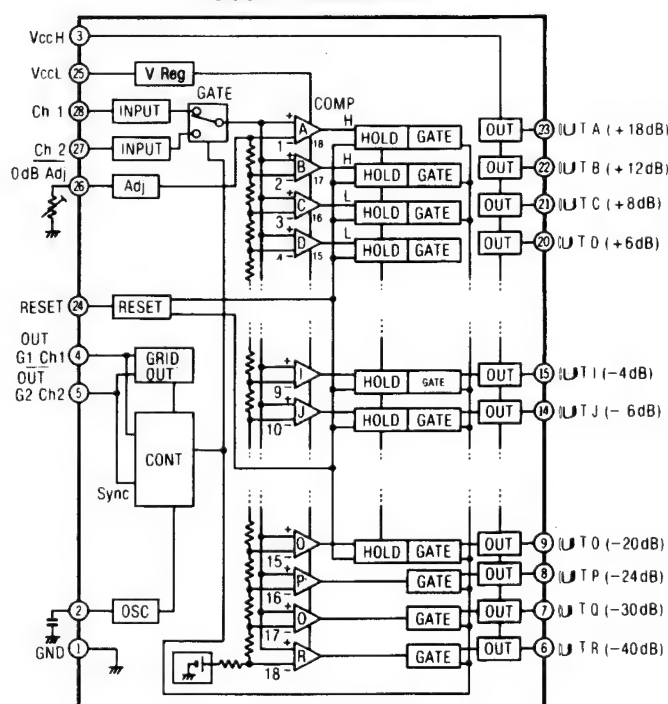
REPLACEMENT PARTS LIST

Important safety notice
Components identified by mark have special characteristics important for safety.
When replacing any of these components, use only manufacturer's specified parts.

Ref. No.	Part No.	Ref. No.	Part No.
RESISTORS		R 37, 38	ERD25TJ104
R 1, 2	ERD25TJ273	R 39, 40	ERD25FJ103
R 3, 4	ERD25TJ394	R 41, 42	ERD25FJ472
R 5, 6	ERD25FJ102	R 43, 44	ERD25FJ272
R 7, 8	ERD25TJ273	R 45, 46	ERD25TJ183
R 9, 10	ERD25FJ102	R 47, 48	ERD25FJ181
R 11, 12	ERD25FJ472	R 49, 50, 51, 52	
R 13, 14	ERD25TJ224		ERD25FJ103
R 15, 16	ERD25FJ100	R 53, 54	ERD25FJ101
R 17, 18	ERD25FJ472	R 55, 56	ERD25FJ512
R 19	ERD25FJ561	R 57, 58	ERD25FJ102
		R 59, 60	ERD25TJ224
R 20	ERD25TJ223		
R 21, 22	ERD25TJ563	R 61, 62	ERD25TJ683
R 23, 24	ERD25FJ101	R 63, 64	ERD25FJ512
R 25, 26	ERD25FJ102	R 65, 66	ERD25FJ222
R 27, 28	ERD25FJ181	R 67, 68	ERD25TJ823
R 29, 30	ERD25TJ334	R 69, 70	ERD25FJ472
R 31, 32	ERD25FJ682	R 71, 72	ERD25TJ123
R 33, 34	ERD25FJ562	R 73, 74	ERD25TJ473
R 35, 36	ERD25TJ225	R 75, 76	ERD25TJ753

EQUIVALENT CIRCUIT

IC501: AN6870N

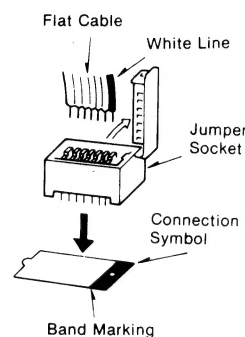


Ref. No.	Part No.	Ref. No.	Part No.	Ref. No.	Part No.	Ref. No.	Part No.	Ref. No.	Part No.	Part Name & Description
R 77, 78	ERD25TJ334	R 337	ERD25TJ563	C 43, 44	ECEA1CS100	TRANSISTORS				MULTIPLEX FILTERS
R 79, 80, 81, 82	ERD25TJ394	R 338	ERQ14AJ180	C 45, 46	ECQM1H472JZ	Q 1, 2, 3 2SD1011				
R 83, 84	ERD25TJ334	R 339	ERD25FJ120	C 47	ECFDD103KVY	Q 4 2SB1036				
R 85	ERD25FJ222	R 340	ERD25FJ103	C 48	ECEA1AS101	Q 5, 6 2SD1450				
R 86	ERD25FJ472	R 341	ERD25FJ471	C 49, 50	ECEA1CS100	Q 7, 8 2SK330GRY				
R 87	ERD25FJ222	R 342, 343	ERD25FJ102	C 51, 52	ECEA1ES4R7	Q 9, 10, 11, 12 2SD1450				
R 88	ERD25FJ472	R 345	ERD25FJ103	C 53, 54	ECQM1H473JZ	Q 13, 14, 15, 16, 17, 18, 19, 20, 21, 22 2SC2603				
R 91, 92	ERD25TJ153	R 346	ERD25FJ332	C 55, 56	ECQM1H333JZ	Q 23, 24 2SD1011				
R 93, 94	ERD25FJ102	R 347	ERD25FJ391	C 57, 58, 59, 60	ECQM1H104JZ	Q 25, 26, 27, 28 2SC2603				
R 95, 96, 97, 98	ERD25TJ104	R 349	ERD25FJ103	C 61, 62	ECQM1H333JZ	Q 29, 30 2SA1115				
R 99, 100	ERD25FJ332	R 351	ERD25FJ103	C 63, 64	ECQM1H224JZ	Q 31, 32 2SK330GRY				
R 101, 102, 103, 104	ERD25TJ223	R 352	ERD25FJ562	C 65	ECQM1H104JZ	Q 33, 34 2SJ105GR				
R 105, 106	ERD25FJ822	R 353	ERD25TJ223	C 66	ECEA50Z3R3	Q 35, 36 2SD1450				
R 107, 108	ERD25TJ333	R 354	ERD25FJ103	C 67, 68	ECEA1HSR22	Q 37, 38 2SA1115				
R 109, 110	ERD25TJ244	R 355	ERD25FJ472	C 69, 70, 71, 72	ECQM1H104JZ	Q 39, 40, 41, 42 2SC2603				
R 111, 112	ERD25TJ154	R 356, 357, 358, 359, 360, 361	ERD25FJ103	C 73, 74, 75, 76	ECQM1H332JZ	Q 301, 302 2SD592				
R 113, 114	ERD25FJ472	R 362	ERD25TJ563	C 77, 78	ECDD1H331J	Q 303 2SA719				
R 115, 116	ERD25TJ333	R 363	ERD25FJ682	C 79, 80	ECQM1H223JZ	Q 304 2SA1115				
R 117, 118	ERD25FJ682	R 364	ERD25TJ563	C 81, 82	ECDD1H471J	Q 305 UN4211TA				
R 119, 120, 121, 122	ERD25FJ332	R 365	ERD25TJ223	C 83, 84	ECEA50MR68R	Q 306 2SD1265				
R 123, 124	ERD25TJ223	R 366	ERD25TJ154	C 85, 86	ECEA1CS100	Q 307 2SB941				
R 125, 126	ERD25FJ472	R 367	ERD25FJ103	C 87, 88	ECQM1H472JZ	Q 308 2SD1275				
R 127, 128	ERD25TJ153	R 368	ERD25FJ332	C 89, 90	ECEA16Z10	Q 309, 310, 311, 312, 313 2SC2603				
R 129	ERD25FJ472	R 369	ERD25FJ332	C 91, 92	ECQM1H333JZ	Q 314 2SA1115				
R 130	ERD25TJ274	R 370	ERD25TJ333	C 93, 94	ECEA50MR33R	Q 315 2SC3242				
R 131, 132	ERD25FJ102	R 371	ERD25TJ563	C 95, 96	ECEA0JS470	Q 316 UN4211TA				
R 133, 134	ERD25FJ103	R 372, 373	ERD25FJ103	C 97, 98	ECDD1H391J	Q 317 2SC2603				
R 135, 136	ERD25FJ151	R 374	ERD25FJ221	C 99, 100	ECQM1H223JZ	Q 318, 319, 320, 321, 322 2SA1115				
R 137, 138	ERD25FJ472	R 375	ERD25FJ681	C 101	ECEA1CS100	Q 501 2SC3311				
R 139, 140	ERD25TJ153	R 376	ERD25FJ470	C 102, 103, 104	ECEA1HS010	Q 502, 503, 504, 505, 506, 507 2SA1115				
R 141	ERD25FJ103	R 377	ERD25FJ102	C 105	ECEA1AS471	Q 508 2SC2603				
R 142	ERD25TJ104	R 378	ERD25FJ681	C 106	ECEA0JS331	Q 601 2SC2603				
R 143	ERD25FJ102	R 379	ERD25TJ684	C 107, 108	ECEA1HS100	Q 602, 603 2SA1115				
R 144	ERD25TJ473	R 510	ERG1ANJ181	C 109, 110	ECKD2H121KB	Q 604, 605 UN4211TA				
R 145	ERD25FJ222	R 511	ERD25FJ472	C 111, 112	ECKD1H561KB	Q 601 2SC2603				
R 147	ERD25TJ153	R 512, 513	ERD25FJ103	C 113, 114	ECEA50Z3R3	Q 602, 603 2SA1115				
R 148	ERD25FJ151	R 514, 515, 516, 517, 518, 519, 520, 521	ERD25TJ563	C 115, 116	ECEA1CN100	Q 604, 605 UN4211TA				
R 149	ERD25FJ102	R 523	ERD25FJ222	C 117, 118	ECQM1H273JZ	Q 601 2SC2603				
R 150, 151	ERG2ANJ560	R 601	ERD25FJ181	C 119, 120	ECFDD472KVY	Q 602, 603 2SA1115				
R 152	ERD25FJ103	R 602	ERD25FJ102	C 125, 126, 127, 128	ECEA1HS010	Q 604, 605 UN4211TA				
R 153, 154	ERD25TJ104	R 603	ERD25TJ223	C 133, 134	ECFDD223KVY	D 1 MA161				
R 155, 156	ERD25FJ102	R 604	ERD25FJ562	C 135	ECFDD103KVY	D 3, 4 MA161				
R 157, 158	ERD25TJ123	R 605	ERD25TJ393	C 136	ECQM1H104JZ	D 5 MA1056				
R 159, 160, 161, 162	ERD25FJ225	R 606	ERD25TJ223	C 137	ECEA1ES4R7	D 6 MA161				
R 163, 164	ERD25FJ182	R 607	ERD25FJ562	C 138	ECKD1H223ZF	D 301 MA1220M				
R 165, 166	ERD25FJ682	R 608	ERD25TJ183	C 139	ECKD1H223ZF	D 302 MA1075LF				
R 167, 168	ERD25FJ102	R 609	ERD25FJ103	C 301, 302	ECDD1H470KC	D 303, 304, 305, 306, 307 SM112				
R 169, 170	ERD25FJ390	R 610	ERD25TJ393	C 303	ECQP1153JZ	D 308, 309, 310, 311, 312, 313, 314, 315, 316, 317 MA161				
R 171, 172	ERD25FJ821	R 615	ERD25FJ562	C 304	ECFDD153KVY	D 319, 320, 321, 322, 323, 324, 325, 326, 327, 328 MA161				
R 173, 174	ERD25FJ272	R 616, 617, 618	ERD25FJ561	C 305	ECFDD822KVY	D 329 LD702DU				
R 175, 176	ERD25FJ103	R 619	ERD25FJ471	C 306, 307	ECEA1ES220	D 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615 MA161				
R 177, 178	ERD25FJ222	R 620	ERD25FJ562	C 308, 309	ECKD1H223ZF	D 616 SLR34YC				
R 179, 180	ERD25FJ272	R 621	ERD25TJ473	C 310, 311	ECEA1CS331	D 617 SLR34GC				
R 181, 182	ERD25FJ222	R 622	ERD25FJ821	C 312	ECKD1H223ZF	D 618 SLR34URC				
R 183, 184	ERD25FJ151	VARIABLE RESISTORS				D 619 LN322GP				
R 185, 186	ERD25FJ392	VR 1, 2	QVNB3A00B223	C 313	ECEA1ES220	D 620 LN422YP				
R 187	ERD25FJ270	VR 3, 4	QVNB3A00B103	C 314	ECEA1ES472	D 621 LN322GP				
R 189, 190	ERD25FJ680	VR 5, 6	QVBP1PUA54	C 315	ECEA1CS222	D 622, 623 QVDLS005M				
R 301	ERD25FJ1R0	VR 7	QVAL5KUG15	C 316	ECEA1ES332	(with Direction LED P.C.B.)				
R 302	ERD25FJ100	VR 8, 9	QVNB3A00B222	C 317	ECEA1CS330	D 624 SM112				
R 303, 304	ERD25FJ562	VR 10	QVNB3A00B103	C 318	ECEA1CS100	INTEGRATED CIRCUITS				
R 305, 306	ERD25FJ100	VR 301, 302	QVNB3A00B474	C 319	ECQM1H394JZ	IC 1 M5218L				
R 307	ERD25FJ222	VR 501	QVNB3A00B223	C 320	ECEA1ES4R7	IC 2 M5220L				
R 311	ERD25FJ222	VR 601	EVNK4AA00B22	C 321	ECEA1HS010	IC 3, 4 NE654N				
R 312	ERD25FJ562	CAPACITORS				IC 5, 6 NE652N				
R 313	ERD25TJ473	C 1, 2	ECEA1HS010	C 322	ECEA1CS221	IC 7 AN6258				
R 316, 317	ERD2FCJ47R	C 3, 4	ECQM1H224JZ	C 323	ECEA1HS010	IC 8 AN6291				
R 318, 319	ERD25FJ681	C 5, 6	ECEA1ES4R7	C 324	ECEA1CS100	IC 9, 10 AN6203				
R 320	ERX2ANJ8R2	C 7, 8	ECCD1H820K	C 325	ECEA1CS221	IC 11, 12 M5218L				
R 321	ERD25FJ102	C 9, 10	ECEA1HS010	C 326, 327	ECEA1CS330	IC 301, 302 M5218L				
R 322	ERD25FJ103	C 11, 12	ECKD1H331KB	C 328	ECEA1CS100	IC 501 AN6870N				
R 323	ERD25TJ153	C 13, 14	ECEA0JS101	C 329	ECQU2A103MF	I.C. PROTECTOR				
R 324	ERD25TJ683	C 17, 18	ECQM1H103JZ	C 330	ECQM1H474JZ	ICP 601 QRUF10WH				
R 325	ERD25FJ472	C 19, 20	ECKD1H331KB	C 331	ECEA1CS100					
R 326, 327	ERD25FJ103	C 21, 22	ECFDD152KVY	C 501, 502	ECEA1HS010					
R 328	ERD25FJ272	C 23, 24	ECFDD122KVY	C 505	ECFDD473KVY					
R 329	ERD25FJ101	C 25, 26	ECEA1ES4R7	C 506	ECEA1CS100					
R 330	ERD25FJ103	C 27, 28	ECKD1H681KB	C 507	ECFDD153KVY					
R 331	ERD25TJ104	C 29, 30	ECEA1HS010	C 601	ECDD1H331J					
R 332	ERD25TJ124	C 31, 32	ECQM1H683JZ	C 602	ECEA1CS100					
R 333	ERD25FJ100	C 33, 34	ECQM1H154JZ	C 603	ECEA1HS010					
R 334	ERD25FJ102	C 35, 36	ECEA1ES4R7	C 604	ECEA0JS101					
R 335	ERD25TJ184	C 37, 38	ECQM1H103JZ	C 605	ECKD1H223ZF					
R 336	ERD25TJ104	C 39, 40	ECQM1H333JZ	COMBINATION PARTS						
		C 41, 42	ECQM1H472JZ	Z 1, 2	EXRP152K473					
				Z 3, 4	EXRP220K124					
				Z 5, 6	EXRP181K153					
				Z 301	EXRP470K683					
				Z 302	EXRP221K334					
				Z 601	EXBEQ4392K					
				Z 602	EXBEQ5562K					


CIRCUIT BOARDS AND WIRING CONNECTION DIAGRAM

CONNECTION OF A FLAT CABLE

Connect the flat cable to the jumper socket so that the white line on the flat cable corresponds to the band mark side of the connection symbol (yellow or white symbol on the PC board) for the jumper socket. (This connection may differ from those for conventional models.)



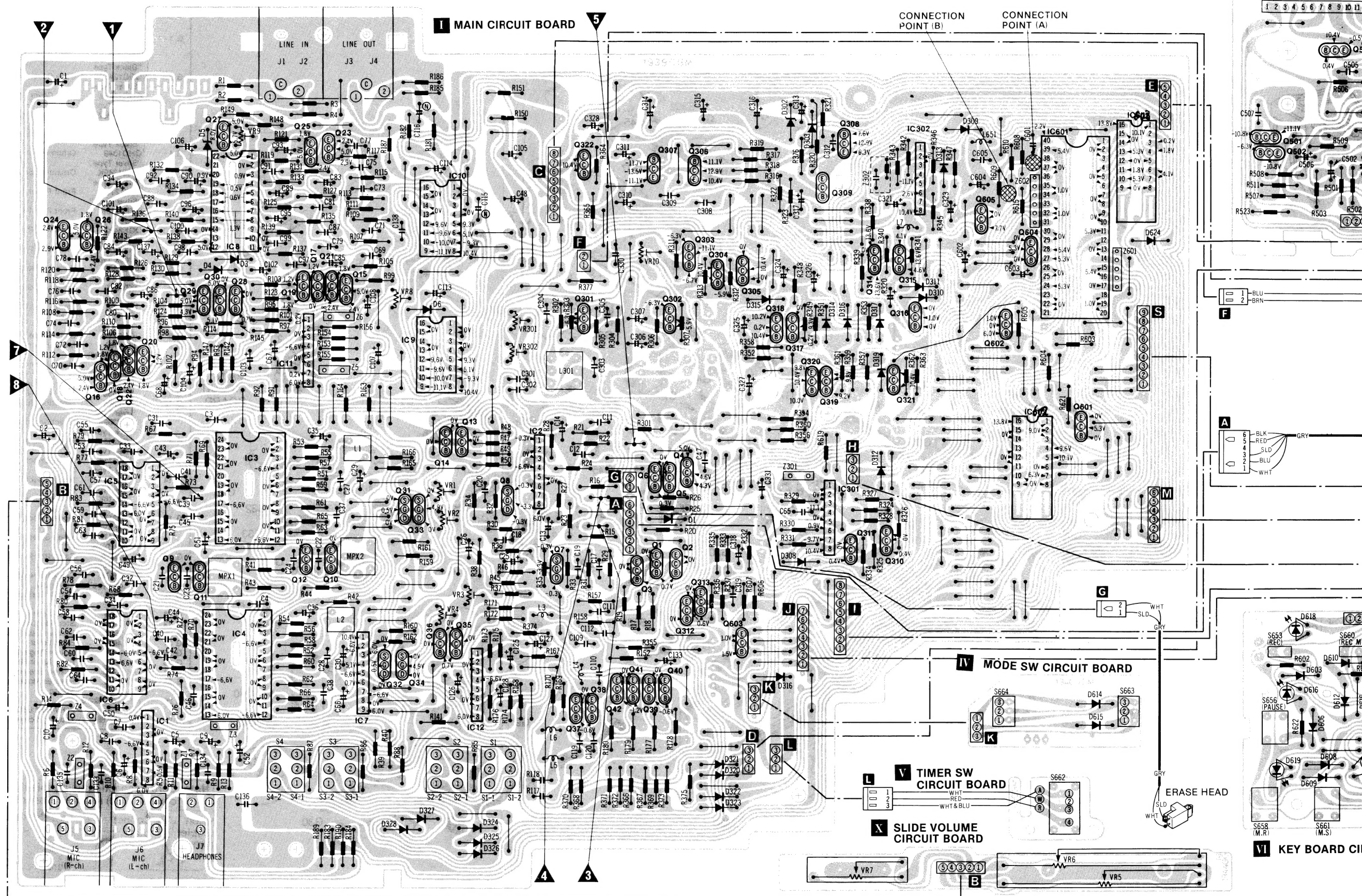
NOTES:

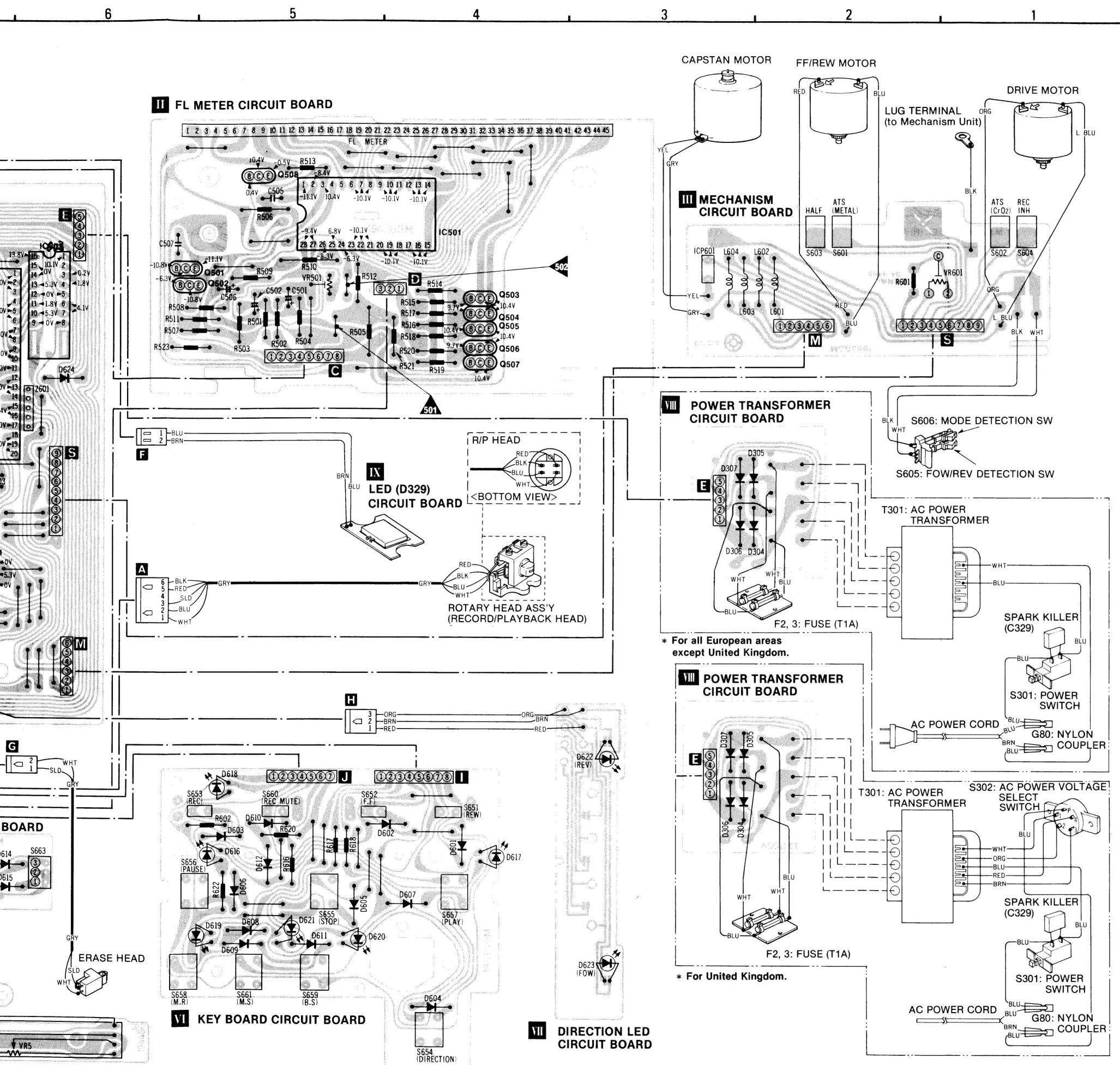
- The circuit shown in  on the conductor side indicates printed circuit on the back side of the printed circuit board.
- All voltage values shown in circuitry are under no signal condition and playback mode with volume control at minimum position. For measurement, use VTVM.

- This circuit board diagram may be modified at any time with the development of new technology.

NOTES:

BLK.....Black	ORG.....Orange
BLU.....Blue	PNK.....Pink
BRN.....Brown	RED.....Red
GRY.....Gray	SLD.....Shield Wire
GRN.....Green	VLT.....Violet
L. BLU.....Light Blue	WHT.....White
NIL.....No Color Mark	YEL.....Yellow





TERMINATIONS

IC2, 7, 11, 12, 301, 302	IC9, 10	IC8
IC602, 603	IC601	IC5, 6
Q1-3, 23, 24, 301-303, 315	Q4-6, 9-22, 25-30, 35-42, 304, 305, 309, 310, 312-314, 316-332, 501-508, 601-605	Q306-308
Q7, 8, 31-34	D301	D303-307
L301, MPX1, 2	L1, 2	L5, 6
D616-618	D619-621	L7, 601
L3, 4	IC1	IC501

CONNECTORS

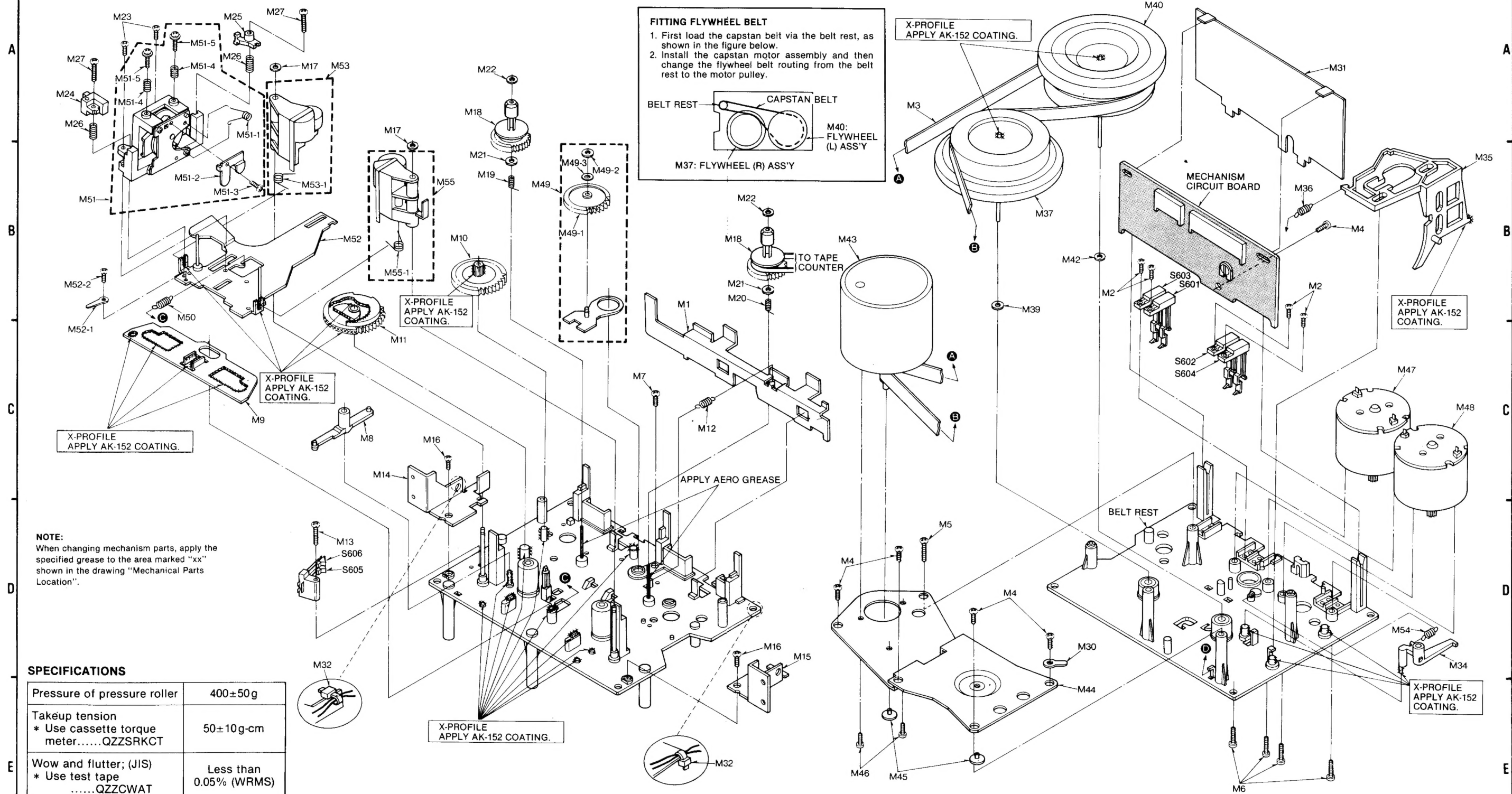
CN1	CN2	CN3	CN4
CN2	CN5	CN6	CN7
CN9	CN10	CN11	CN12
CN13 (Type-L)	CN14 (Type-L)		

Removing contacts

Push the pawl of a contact in each hole in the housing with a flat bladed screwdriver and pull its lead wire to remove the contact.

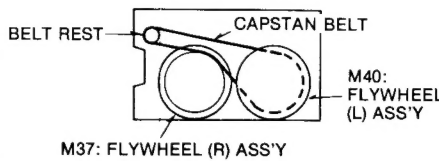
MECHANICAL PARTS LOCATION

CABINET



FITTING FLYWHEEL BELT

1. First load the capstan belt via the belt rest, as shown in the figure below.
2. Install the capstan motor assembly and then change the flywheel belt routing from the belt rest to the motor pulley.



X-PROFILE
APPLY AK-152 COATING.

X-PROFILE
APPLY AK-152 COATING.

X-PROFILE
APPLY AK-152 COATING.

X-PROFILE
APPLY AK-152 COATING.

APPLY AERO GREASE

X-PROFILE
APPLY AK-152 COATING.

X-PROFILE
APPLY AK-152 COATING.

X-PROFILE
APPLY AK-152 COATING.

NOTE:
When changing mechanism parts, apply the specified grease to the area marked "xx" shown in the drawing "Mechanical Parts Location".

SPECIFICATIONS

Pressure of pressure roller	400±50 g
Takeup tension * Use cassette torque meter.....QZZSRKCT	50±10 g-cm
Wow and flutter; (JIS) * Use test tape .....QZZCWAT	Less than 0.05% (WRMS)

REPLACEMENT PARTS LIST

Ref. No.	Part No.	Part Name & Description	Ref. No.	Part No.	Part Name & Description	Ref. No.	Part No.	Part Name & Description	Ref. No.	Part No.	Part Name & Description	Ref. No.	Part No.	Part Name & Description	Ref. No.	Part No.	Part Name & Description
MECHANICAL PARTS																	
M 1	QMA4620	Eject Angle	M 11	QDG1309	Main Gear	M 23	XTN26 + 6B	Tapping Screw @2.6 x 6	M 39	QBW2116	Washer (2.4φ)	M 49-1	QDG1307	Center Gear	M 52	QXK2764	Head Base Plate Assembly
M 2	XTN2 + 8B	Tapping Screw @2 x 8	M 12	QBT2003	Eject Angle Spring	M 24	QWY2148Y	Erase Head	M 40	QXF0220	Flywheel (L) Assembly	M 49-2	QBW2007	Washer (2.5φ)	M 52-1	QTD1258	Lug Terminal
M 3	QDB0347	Flywheel Belt	M 13	XTN2 + 14B	Tapping Screw @2 x 14	M 25	QMG0124	Tape Guide	M 42	QBW2117	Washer (2.7φ)	M 49-3	QBH0151	Spacer	M 52-2	XTN2 + 4B	Tapping Screw @2 x 4
M 4	XTN3 + 8B	Tapping Screw @3 x 8	M 14	QMA4628	Mechanism Angle-L	M 26	QBC1448	Tape Guide Spring	M 43	QXU0331	Capstan Motor Assembly (with Motor Governor P.C.B.)	M 50	QBT1742	Head Base Plate Spring	M 53	QXL1654	Pressure Roller Arm (L) Assembly
M 5	XTN3 + 22B	Tapping Screw @3 x 22	M 15	QMA4627	Mechanism Angle-R	M 27	XSN2 + 18	Screw @2 x 18	M 44	QMA4619	Flywheel Holding Plate	M 51	QXV0195	Rotary Head Assembly (Record/Playback Head)	M 53-1	QBN1992	Pressure Roller Spring (L)
M 6	XSN26 + 10	Screw @2.6 x 10	M 16	XTN3 + 6B	Tapping Screw @3 x 6	M 28	QJT0015	Lug Terminal	M 45	QMZ1306	Flywheel Thrust Retainer	M 51-1	QBN1994	Click Spring	M 54	QBT1962	Obstruction Lever Spring
M 7	XTN3 + 6B	Tapping Screw @3 x 6	M 17	QBW2046	Washer (3φ)	M 29	QTD1315	Insulator Sheet	M 46	XSN26 + 3	Screw @2.6 x 3	M 51-2	QBP1993	Head Thrust Spring	M 55	QXL1655	Pressure Roller Arm (R) Assembly
M 8	QML4025	Change Lever	M 18	QDR1173	Reel Table	M 30	QTD1315	Cord Clamper	M 47	QXU0332	FF/REW Motor Assembly	M 51-3	XTN2 + 4B	Screw @2 x 4	M 55-1	QBN1993	Pressure Roller Spring (R)
M 9	QMR2096	Change Rod	M 19	QBC1449	Reel Table Spring-L	M 31	QTD1315	Cord Clamper	M 48	QXU0333	Drive Motor Assembly	M 51-5	QHQ1352	Head Spring			
M 10	QDG1308	Sub Gear	M 20	QBC1450	Reel Table Spring-R	M 32	QTD1315	Cord Clamper	M 49	QXG1076	Center Gear Assembly						
			M 21	QBW2012	Washer (2.1φ)	M 33	QML4026	Obstruction Lever									
			M 22	QBW2008	Washer (2φ)	M 34	QMR2097	Eject Rod									
						M 35	QBT1947	Head Release Spring									
						M 36	QBT1947	Head Release Spring									
						M 37	QXF0221	Flywheel (R) Assembly									

CABINET PARTS LOCATION

REPLACEMENT PARTS LIST

Important safety notice
Components identified by Δ mark have special characteristics important for safety.
When replacing any of these components, use only manufacturer's specified parts.

Ref. No.	Part No.	Part Name & Description
CABINET PARTS		
G 1	QYF0700 "Silver Type"	Cassette Lid Assembly
	QYF0700K "Black Type"	Cassette Lid Assembly
G 2	QGC1245 "Silver Type"	Case Cover
	QGC1245K "Black Type"	Case Cover
G 3	XTB3 + 8BFN "Silver Type"	Tapping Screw $\Phi 3 \times 8$
	XTB3 + 8JFZ "Black Type"	Tapping Screw $\Phi 3 \times 8$
G 4	QH01349 "Silver Type"	Ornament Screw
	QH01349K "Black Type"	Ornament Screw
G 5	QYP1215S "Silver Type"	Front Panel Assembly
	QYP1215K "Black Type"	Front Panel Assembly
G 5-1	QK3432 "Silver Type"	Ornament Plate
	QK3432K "Black Type"	Ornament Plate
G 5-2	QGO2308	Function Button
G 5-3	refer to D329	LED (D329)
G 6	QYT0657	Valance Control Knob Assembly
G 7	QYT0658	Input Level Control Knob Assembly
G 8	QGG0227	Slide Guide
G 9	QGL1189 "Silver Type"	Meter Filter
	QGL1189K "Black Type"	Meter Filter
G 10	QGO2306	Eject Button
G 11	QMA4636	Side Angle-R
G 12	QGO2309 "Silver Type"	Direction Button
	QGO2309K "Black Type"	Direction Button
G 13	QGO2315 "Silver Type"	Mode Select Button-A
	QGO2315K "Black Type"	Mode Select Button-A
G 14	QGO2316 "Silver Type"	Mode Select Button-B
	QGO2316K "Black Type"	Mode Select Button-B
G 15	QGO2317 "Silver Type"	Mode Select Button-C
	QGO2317K "Black Type"	Mode Select Button-C
G 16	QYF0697S "Silver Type"	Cassette Holder Assembly
	QYF0697K "Black Type"	Cassette Holder Assembly
G 17	QBP1925	Holder Spring
G 18	QBN1961	Eject Spring
G 19	XUBQ4FT	Stop Ring 4 ϕ
G 20	QYF0627	Dumper Gear Assembly
G 21	QML4063	Eject Lever
G 22	QMA4626	Holder Angle-L
G 23	QBP2007	Eject Lever Spring
G 24	QMB1429	Button Bushing
G 25	QBC1473	Reverse Mode Button Spring
G 26	refer to D622 & D623	FOV/REV LED
G 27	XTN26 + 6B	Tapping Screw $\Phi 2.6 \times 6$

Ref. No.	Part No.	Part Name & Description
G 28	XTN26 + 6BFZ	Tapping Screw $\Phi 2.6 \times 6$ (Black)
G 29	XTN3 + 10B	Tapping Screw $\Phi 3 \times 10$
G 30	XTB3 + 10BFN	Tapping Screw $\Phi 3 \times 10$
G 31	XWG3	Washer 3 ϕ
G 32	QGC1246	Bottom Cover
G 33	QKA1094	Rubber Foot
G 34	QDB0169	Counter Belt
G 35	QKJ0609	Nylon Rivet
G 36	[D] QMK2121	Back Chassis
	[For all European areas except United Kingdom.]	
	[B] QMK2122	Back Chassis
	[For United Kingdom.]	
G 37	QMR2059	Power Switch Rod
G 38	QGO2142	Power Button
G 39	QGT1642	Timer Button
G 40	QGO2310	NR Button-A ("C")
G 41	QGO2311	NR Button-B ("B")
G 42	QGO2312	NR Button-C ("OUT")
G 43	QGO2313	NR Button-D ("TAPE")
G 44	QGO2314	NR Button-E ("DISC")
G 45	XTB3 + 8BFN	Tapping Screw $\Phi 3 \times 8$
G 46	XTB3 + 12BFZ	Tapping Screw $\Phi 3 \times 12$
G 47	XTB3 + 12BFN	Tapping Screw $\Phi 3 \times 12$
G 48	QGO2307R	Push Button (REC)
G 49	QGO2307D	Push Button (REC MUTE)
G 50	QGO2307H	Push Button (FF/REW)
G 51	XSB3 + 6BNS	Screw $\Phi 3 \times 6$
G 52	QKJ0608	Tapping Support
G 53	QTH1178	Heat Sink
G 54	XSN3 + 8S	Screw $\Phi 3 \times 8$
G 55	QMA4680	MIC Angle
G 56	QJC0069	Earth Plate
G 57	QNC1070	Nut 12 ϕ
G 58	XTN3 + 8B	Tapping Screw $\Phi 3 \times 8$
G 59	QKJ0683	LED Holder (for D619-621)
G 60	QMK2092	Operation Chassis
G 61	QXC0084	Tape Counter Assembly
G 62	QSF1011F	FL Meter
G 63	QKJ0681	Meter Holder
G 64	QTS1617	Shield Plate (for FL Meter)
G 65	QMA4681	Volume Angle
G 66	XSN2 + 3	Screw $\Phi 2 \times 3$
G 67	QMA4679	Side Angle-L
G 68	[D] Δ RJA23Z	AC Power Cord
	[For all European areas except United Kingdom.]	
	[B] Δ QFC1205M	AC Power Cord
	[For United Kingdom.]	
G 69	QTD1164	Cord Bushing
G 70	[B] QTW00026	Switch Cover (for S302)
	[For United Kingdom.]	
G 71	QTW1195	Spark Killer Cover
G 72	[B] QMA4603	Switch Angle (for S302)
	[For United Kingdom.]	
G 73	QTD1315	Nylon Binder
G 74	QMA4729	Fuse Angle
G 75	Δ QTF1020	Fuse Holder
G 76	XTN3 + 6B	Tapping Screw $\Phi 3 \times 6$
G 77	XWA3B	Washer 3 ϕ
G 78	QTD1322	Cord Clamper
G 79	QBJ1425	Cord Bushing
G 80	Δ QJT1079	Nylon Coupler
G 81	QKJ0598	Switch Cover
G 82	XTN3 + 24B	Tapping Screw $\Phi 3 \times 24$
G 83	[B] QGS3160	Main Name Plate
	[For United Kingdom.]	

ACCESSORIES

Ref. No.	Part No.	Part Name & Description
A 1	QEB0125	Connection Cord
A 2	QQT3571	Instruction Book

PACKINGS

Ref. No.	Part No.	Part Name & Description
P 1	QPN4514	Inside Carton
P 2	QPA0701	Cushion-R
P 3	QPA0702	Cushion-L
P 4	QPS0434	Pad
P 5	QPA0712	Spacer
P 6	XZB40X60A02	Poly Sheet (for UNIT)
P 7	QPC0072	Poly Sheet (for AC Power Cord)

NOTES:

- [D]..... For all European areas except United Kingdom.
[B]..... For United Kingdom.

Note: Cord connection using this nylon coupler (G80) requires a special tool.

